JOURNAL

OF THE

Agricultural and Horticultural Society

OF

INDIA

EDITED BY

THE COMMITTEE OF PAPERS.

VOL. II.

PART I.—SEPTEMBER 1869, TO DECEMBER 1870.

ORIGINAL COMMUNICATIONS.

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Calcutta:

PRINTED BY T. BLACK & CO., 55, BENTINCK STREET.

MDCCCLXXI.

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3.—Proposals are received for Insurances for the whole term of life, either on a *participating scale,* or on a *non-participating scale at a lower rate of premium.* Also for short periods varying from one to seven years on *very moderate terms.*

4.—An annual division is made of one-fifth of the ascertained profits of the five preceding years, the other four-fifths being set apart to enter into the average of succeeding years.

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6.—During the last twelve years the reduction of Premium on policies entitled to participate in profits has averaged more than 44 per cent. and during the last three years it has been declared at the rate of 45 per cent. on the original annual amount.

7.—The following table will shew the result of the last division of profits as declared on the 11th May, 1853.

Age.	Date of Policy.	Sum Assured.	Original Annual Premium.	Reduction.	Reduced Annual Premium.
		Co 's Rs.	Co.'s Rs.	Co.'s Rs.	
20	on or before the 11th May, 1848.	10,000	420	189-0	231-0
30		10,000	480	216-0	264-0
40		10,000	590	265-8	324-0
50		10,000	740	333-0	407-0
60		10,000	1,030	463-8	566-8

8.—The following is an Extract of the rates of premium for short term Policies and for Assurances for life *without* participation in profits.

ANNUAL PREMIUM FOR ASSURANCE OF RUPEES 1,000.

Civil.

Age.	1 year.	3 years.	5 years.	7 years.	Life with out profits.
20	22	22	23	24	32
30	27	28	28	29	39
40	32	32	32	33	49
50	38	40	40	43	62
60	51	52	56	60	88

Military.

Age.	1 year.	3 years.	5 years.	7 years.	Life with out profits.
20	26	27	28	28	36
30	32	32	33	34	45
40	39	40	40	40	53
50	45	46	47	48	64
60	56	57	60	64	90

9.—On return of Assurers to Europe for a permanent residence, their premiums are immediately reduced to the English rates, both on the *participating* and *non-participating* scales.

10.—Military Officers holding civil appointments are allowed to subscribe at the civil rates of premium.

11.—Premiums are payable either annually, half-yearly, or quarterly, and a grace of 28 days is allowed for such payments.

12.—Medical referees are remunerated by the Society.

13.—At the period of last annual valuation, the Assets of this Society were ascertained to be upwards of £630,000. The amount of Policies in force about £2,000,000, and the annual income arising from premiums thereon £90,000, exclusive of interest on the invested capital.

BRADDON AND CO.

CALCUTTA, *November* 1, 1853. *Agents and Secretaries.*

Indian Rates of the Universal Life Assurance Society.

TABLE NO. 1.—CIVIL SERVICE.

Annual Premiums required for the Assurance of 1,000 Rs. for periods from One to Seven years, on the Lives of persons in the H. C. Civil Service, and others not exposed to the hazards of Military and Maritime occupations, *without participation* in the Profits of the Society.

Age.	One year.	Three years.	Five years.	Seven years.
18	21	22	23	23
19	22	22	23	24
20	22	22	23	24
21	22	23	24	24
22	23	24	24	24
23	23	24	24	25
24	24	24	25	26
25	24	24	25	26
26	24	25	26	27
27	25	26	27	28
28	26	27	28	28
29	27	28	28	28
30	27	28	28	29
31	28	28	29	29
32	28	29	29	30
33	28	29	30	30
34	28	29	30	31
35	30	30	31	31
36	30	30	31	32
37	31	31	32	32
38	31	32	32	32
39	31	32	32	32
40	32	32	32	33
41	32	32	33	34
42	32	32	34	35
43	33	34	35	36
44	34	35	35	36
45	34	35	36	38
46	35	36	36	39
47	36	36	38	40
48	36	37	39	40
49	37	39	40	42
50	38	40	40	43
51	40	40	42	44
52	40	42	44	45
53	42	44	44	47
54	43	44	46	48
55	44	45	48	48
56	45	47	48	50
57	46	48	50	52
58	48	50	52	54
59	49	51	54	56
60	51	52	56	60

TABLE NO. 2.—MILITARY AND NAVAL.

Annual Premiums required for the Assurance of 1,000 Rs. for periods from One to Seven years, on the Lives of persons exposed to the hazards of Military and Maritime occupations, *without participation* in the Profits of the Society.

Age.	One year.	Three years.	Five years.	Seven years.
18	25	25	26	27
19	26	26	27	28
20	26	27	28	28
21	27	28	28	28
22	28	28	28	29
23	28	28	29	30
24	28	28	29	30
25	28	29	30	31
26	29	30	31	32
27	29	30	31	32
28	30	31	32	32
29	31	32	32	33
30	32	32	33	34
31	32	33	34	35
32	32	34	34	36
33	33	35	36	36
34	34	36	36	37
35	35	36	37	38
36	36	36	37	38
37	36	37	38	39
38	37	38	39	40
39	38	39	40	40
40	39	40	40	40
41	40	40	40	41
42	40	40	41	42
43	40	41	42	43
44	41	41	43	44
45	42	42	43	44
46	43	43	44	44
47	43	44	44	45
48	44	44	45	46
49	44	45	46	48
50	45	46	47	48
51	46	47	48	49
52	47	48	49	50
53	48	49	50	52
54	49	50	52	52
55	50	51	52	53
56	51	52	53	55
57	52	53	55	56
58	53	55	56	58
59	54	56	58	60
60	56	57	60	64

⁂ *Premiums are received in half-yearly payments for the convenience of the Assured, but in case of lapse the full premium of the current year will be charged.*

Table No. 1. Example.—A person aged 30, may, by paying 27 Rs., secure 1,000 Rs. to his representatives, if his death should occur within *one* year; if within *five* years by paying 28 Rs. annually, and if within *seven* years, by paying 29 Rs. per annum.

Table No. 2, Example.—A person aged 30, may by paying 32 Rs. secure 1,000 Rs. to his representatives, if his death should occur within *one* year; if within *five* years by paying 33 Rs. annually, and if within *seven* years by paying 34 Rs. per annum.

UNIVERSAL LIFE ASSURANCE SOCIETY.

WHOLE LIFE.

Age	CIVIL.		MILITARY AND NAVAL.		ENGLISH RATES.		Age.
	TABLE No. 3. Annual Premiums required for the Assurance of 1,000 Rs. with participation in profits, and reduction of Premium on return to Europe.	**TABLE No. 5.** Annual Premiums required for the Assurance of 1,000 Rs. *without participation in profits, but with reduction of Premium on return to Europe.*	**TABLE No. 4.** Annual Premiums required for the Assurance of 1,000 Rs. with participation in profits, and reduction of Premium on return to Europe.	**TABLE No. 6** Annual Premiums required for the Assurance of 1,000 Rs. *without participation in profits, but with reduction of Premium on return to Europe.*	Annual Premium for assuring £100, for the whole of life, with participation in profits. Inserted as a guide to persons insured in India under Tables Nos. 3 and 4.	Annual Premium for assuring £100, for the whole of life, without participation in profits. Inserted as a guide to persons insured in India under Tables, Nos. 5 and 6.	
18	41	31	45	34	1 17 2	1 13 6	18
19	42	32	46	35	1 17 11	1 14 2	19
20	42	32	47	36	1 18 8	1 14 10	20
21	43	33	48	37	1 19 6	1 15 7	21
22	43	34	49	38	2 0 5	1 16 5	22
23	44	35	49	39	2 1 4	1 17 3	23
24	44	36	50	40	2 2 3	1 18 1	24
25	45	36	51	41	2 3 3	1 19 0	25
26	46	37	51	42	2 4 4	1 19 11	26
27	46	38	52	43	2 5 5	2 0 11	27
28	47	38	53	44	2 6 7	2 2 0	28
29	48	39	54	45	2 7 8	2 2 11	29
30	48	39	54	45	2 8 10	2 4 0	30
31	49	40	55	46	2 9 11	2 5 0	31
32	50	41	56	46	2 11 0	2 5 11	32
33	51	42	57	47	2 12 3	2 7 1	33
34	52	43	58	47	2 13 7	2 8 3	34
35	53	43	58	47	2 14 11	2 9 6	35
36	54	45	59	49	2 16 5	2 10 10	36
37	55	46	60	50	2 18 0	2 12 3	37
38	56	47	61	51	2 19 7	2 13 8	38
39	58	48	62	52	3 1 3	2 15 2	39
40	59	49	63	53	3 3 0	2 16 9	40
41	60	51	64	54	3 4 9	2 18 4	41
42	62	52	65	55	3 6 6	2 19 11	42
43	63	53	66	56	3 8 3	3 1 6	43
44	65	54	68	57	3 10 2	3 3 2	44
45	66	55	69	58	3 12 2	3 5 0	45
46	67	57	70	60	3 14 5	3 7 0	46
47	69	58	72	61	3 16 9	3 9 1	47
48	70	60	73	62	3 19 4	3 11 5	48
49	72	61	75	63	4 2 3	3 14 1	49
50	74	62	77	64	4 5 6	3 17 0	50
51	76	65	79	67	4 9 1	4 0 3	51
52	79	68	81	70	4 12 10	4 3 7	52
53	81	71	83	73	4 16 11	4 7 3	53
54	84	74	86	76	5 1 2	4 11 1	54
55	87	76	89	78	5 5 10	4 15 3	55
56	89	79	91	81	5 10 10	4 19 9	56
57	92	81	94	83	5 16 2	5 4 7	57
58	96	84	98	86	6 1 10	5 9 8	58
59	99	86	101	88	6 7 7	5 14 10	59
60	103	88	105	90	6 13 2	5 19 11	60

⁂ *Premiums are received in Half-yearly payments for the convenience of the Assured, but in case of lapse, the full premium of the current year will be charged.*

In the event of the parties whose lives are assured returning to reside permanently in Europe, they will be reduced to the English rates from the date when their premiums first fall due after arrival.

Parties visiting England *on Furlough* or for a *temporary residence* will be required to pay the Indian premium during residence in England, without reference to the number of years the same may previously have been paid in India.

Parties assured in Company's Rupees in India, who may determine on paying their future premiums in England will be required to pay them at the fixed rate of Exchange of Two Shillings per Company's Rupee; and in the event of such assurance becoming a claim payable in England, the sum assured will be paid at the same fixed rate of Exchange of Two Shillings per Company's Rupee.

List of Orchideous Plants Indigenous to Assam and the Neighbouring Hills of Khasya, Bootan, &c.

No.	NAMES.	Size and Colour of Flower.	Habit.
1*	Microstylis Wallichii?	Small, pea green	Ter.
2	Oberonia indifolia	Minute, yellowish	Epi.
3*	,, sp.	,, ,,	Do.
4	Liparis sp.	Small, yellow	Do.
5	,, sp.	,, ,,	Do.
6**	,, sp.	Largish, green yellow	Ter.
7*	,, sp.	Small, deep purple	Epi.
8	Otochilus fuscus	,, yellowish brown	Do.
9	,, albus	,, ,, and white	Do.
10	Pholidota imbricata	,, white	Do.
11	,, undulata	,, ,,	Do.
12*	,, articulata	,, ,,	Do.
13*	,, sp.	,, ,, and yellow	Do.
14*	,, sp.	,, ,, ,,	Do.
15	Cœlogyne flavida	,, yellow	Do.
16	,, undulata	Largish, white	Do.
17*	,, fimbriata?	,, ,, and brown	Do.
18**	,, uniflora	,, ,, and lateritious	Do.
19	,, barbata	,, white	Do.
20*	,, præcox?	,, ,,	Ter.
21*	,, maculata	Large, white, yellow, & rose	Do.
22**	,, Wallichiana	,, ,, and rose	Do.
23**	,, ocellata	,, pale yellow & deep orange	Do.
24*	,, Gardneriana	,, white and yell.	Epi.
25	,, cristata	,, ,, streaked with bright yellow	Ter.
26	,, sp.	Small, brown and yellow	Epi.
27**	,, flava?	Large, yell. and brown	Do.
28	,, sp.	Small, brown and yell.	Do.
29*	,, sp.	,, white & brown	Do.
30	,, sp.	,, pale yellow	Do.
31**	,, sp.	,, white (pretty)	Ter.
32**	,, sp.	Largish, pale cinnamon	Epi.
33**	Bolbophyllum leopardinum	Large, yellow spotted with purple	Do.
34	,, umbellatum	Largish, dull yellow	Do.
35**	,, Khasyanum	Small, greenish	Do.
36**	,, sp.	Largish, bright yellow	Do.
37*	,, sp.	Small, white, fragrant	Do.
38*	,, sp.	,, dull purple	Do.
39	,, sp.	,, ,,	Do.
40	,, sp.	,, ,,	Do.
41**	Cirrhopetalum sp.	Small, greenish, fragrant	Do.
42	,, sp.	,, dull purple	Do.
43*	,, sp.	Large, brown and yell.	Do.
44**	,, sp.	Largish, dull purple	Do.
45**	,, sp.	,, ,,	Do.
46*	Tricosina suavis	Large, white, purple & yellow	Do.
47*	Eria flava	Largish, dull yellow and brown	Do.
48	,, sp.	Largish, white streaked with brown	Epi.
49	,, densiflora	,, ,, tinged with yellow	Do.
50	,, ferruginea	,, ferruginous	Do.
51	,, paniculata	Small, spotted with purple	Do.
52**	,, sp.	Largish, white	Do.
53 *	,, sp.	,, ,, and dull purple	Do.
54*	,, sp.	,, ,, ,,	Do.
55*	,, sp.	Minute, rosy	Do.
56	Aporum anceps	Small, white	Do.
57	,, cuspidatum	,, ,,	Do.
58	,, sp.	,, ,,	Do.
59*	,, sp.	Largish, white, yellow, and brown	Do.
60	Dendrobium [illegible]	Large, pink and yellow	Epi.
61*	,, heterocarpum,	,, yell. and brown fragrant	Do.
62	,, Curysanthum	,, lively yell. and brown	Do.
63*	,, Paxtoni	,, ,, ,,	Do.
64*	,, sp. like do.	,, orange & brown	Do.
65*	,, formosum	Very large, white and yellow, fragrant	Do.
66**	,, longicornu,	Large, white and orange	Do.
67	,, calceolus	Very dark yellow, rose, and purple	Do.
68*	,, sulcatum,	Large, yell. and purple	Do.
69	,, Jenkinsii	,, lively yellow	Do.
70	,, cærulescens	,, deep lively purp.	Do.
71	,, nobile	,, white rosa purp.	Do.
72**	,, Gibsonii	,, yellow & brown	Do.
73*	,, stuposum	Small, white	Do.
74*	,, Cambridgeanum	Large, lively yellow and brown	Do.
75**	,, transperens	,, deep lively purp.	Do.
76*	,, like do., various	,, pale rose & pur.	Do.
77**	,, Devonianum	,, lilac rose & yell.	Do.
78**	,, Dalhousianum	,, rose, white, and purple	Do.
79	,, multicaule	,, white and purp.	Do.
80**	,, Griffithii	,, pale yellow and orange.	Do.
81**	,, Farmeri	,, lively ,, ,,	Do.
82**	,, densiflorum pallid.	,, white & orange	Do.
83**	,, do. roseum	,, pale rose and orange	Do.
84	,, intermedium	,, pale yellow and brown	Do.
85*	,, sp.	,, lively orange	Do.
86*	,, sp.	,, ,, yellow and brown	Do.
87**	,, sp.	,, yellow, pink, & brown	Do.
88*	,, sp.	,, pink and yellow	Do.
89**	Spathoglottis pubescens	Largish, yellow & purp	Ter.
90	Arundina bambusifolia	Large, pale rose & lively purple yell. & br.	Do.
91*	Phaius grandifolius	,, white, brown, & purple	Do.
92	,, Walichii	,, ,, ,, ,,	Do.
93*	,, maculata	,, ,, rosy-scented	Do.
94*	,, albus	,, ,, ,, ,,	Do.
95**	Aputaria senilis	Largish, rose and green	Do.
96**	A. latifolia	?	Do.
97*	Eulophia virens	Large, green and white	Do.
98**	,, sp.	,, dull yellow and brown	Do.
99**	,, sp.	,, deep purple	Do.
100**	,, sp.	,, green and yell.	Do.
101**	,, sp.	,, purplish green	Do.
102	Vanda teres	Very large, rosy purple yellow and brown	Epi.
103**	,, cristata	Largish, greenish, white, and purple	Do.
104**	,, multiflora	,, white and rose	Do.
105**	,, cœrulea	Very large, deep blue	Do.
106**	,, sp.	Largish, dull purple	Do.
107**	,, sp.	,, ,, & green	Do.
108**	,, sp.	,, yellow and br.	Do.
109**	Camarotis purpuria.	Small, yellow and purp.	Do.
110	Micropera pallida	,, pale yellow	Do.
111	Saccolabium micrantum	Small, rosy	Epi.
112	,, retusum	Largish, lively spotted	Do.

No.	NAMES.	Size and Colour of Flower.	Hath.
	Saccolabium papillosum	Small pale yellow and purple	Epi.
	„ Calceolare	„ yellow and br.	Do.
**	„ sp. like ditto	like ditto & rose	Do.
**	„ caroifolium	„ rosy	Do.
	„ dasypogon	„ green and purp.	Do.
**	„ appendiculatum	„ yellow	Do.
* *	„ sp.	„ rosy and deep purple	Do.
	Sarcanthus sp.	„ „ „	Do.
**	„ sp.	Small, rosy	Do.
**	„ sp.	„ white and yell.	Do.
**	„ sp.	„ „ „	Do.
**	„ sp.	„ „ „	Do.
**	„ sp.	„ rosy red	Do.
**	Aerides affine	Large, rosy purple	Do.
	„ odoratum	„ „ sweet-scented	Do.
	„ sp.	„ „ „	Do.
**	„ sp.	Large, like affine, and very sweet-scented	Do.
	Agrostophyllium Khasyanum	Small, white	Do.
*	Xiphosium acuminatum	Large, white	Do.
	Acanthophippium sp.	„ dull purple	Ter.
	„ sp.	„ white streaked	Do.
* *	Cymbidium giganteum	Very large, yellow and brown	Do.
	„ pendulum	Large, dull yellow and purple	Do.
	„ aloifolium	„ „ „	Do.
	„ eburneum	Very large, white	Do.
**	„ inconspicuum	Small, brown	Do.
	„ longipetalum	Largish, green & purple	Do.
	„ cyprifolium	„ „ „	Do.
* **	„ sp.	Large, fragrant yellow and white	Epi.
	„ sp.	„ brownish purple	Do.
**	„ sp.	Very large, white	Do
**	„ sp.	Large, white and brown	Do.
** *	„ sp.	„ green and dull purple	Ter.

No.	NAMES.	Size and Colour of Flour.	Habit.
146**	? Phalænopsis, sp.	Large, yellow & reddish brown	E
147	Euphorboscis pygmæa	Minute, yellow	D
148	Geodorum dilatatum	Large, white, purple and yellow	D
149*	„ sp.	„ deep rosy purple and white	D
150**	Platanthera sp.	Large, white	D
151**	Peristylis sp.	Largish, white, sweet-scented	D
152	Habenaria hamigera?	Small, green	D
153	„ sp.	„ yellow	D
154	„ sp.	„ greenish, yellow	D
155*	„ sp.	„ white	D
156**	„ sp.	Large, white	D
157**	Pogonia Joliana	Small, rosy white	D
158**	„ sp.	Largish, green	D
159**	„ sp.	Small, purple	D
160**	Cyrtosia sp.	Largish, golden yellow	D
161**	Spiranthes sp.	Small, white	D
162**	Zeuxine sulcata	„ „	D
163**	Anæctochilus Roxburghii	„ rosy white	D
164**	„ sp.	„ white	D
165**	Cypripedium venustum	Large, green and purple	D
166**	„ insigne	„ red and yellow	D
167*	Calanthe densiflora	„ lively yellow	D
168**	„ sp.	Small, brown and yellow	D
169**	„ sp.	Large, white and green	D
170**	„ sp.	„ „ and yellow	D
171**	„ sp.	„ dull purple	D
172	Goodyera sp.	Small white	D
173	„ sp.	„ „	D
174	„ sp	„ „ dull purp.	D
175**	Ophrys sp.	Largish, rosy purple	D
176**	„ sp.	„ green and purple	D
177**	Anthoginum sp.	„ rosy	D
178*	Bonatea sp.	Small, green	D

Æschynathus (3 to 4 sp.): Hoya (5 or 6 sp.); Arum (several) Lilium (1 sp.); Nepenthes (1 sp.); Ferns a Lycopodiums (150 to 200 sp.); Palms (Livistonia, Leoxalia, Caryota, Calamus, &c.) are also indigenous, and c be sent if required.

Plants not marked are common.

Plants marked with an asterisk are considered rare.

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Garstin, Charles, Esq. Civil service, Sarun,	1838
Garstin, Lieut.-Colonel Edward, Engineers, Calcutta,	1834
Gasper, G. M. Esq. Merchant, Calcutta,	1846
Gerard, Capt. John Grant, Sub-Asst. Commy. Genl. Hissar,	1838
Gifford, John, Esq. Merchant, Calcutta,	1846
Gilbert, Major General Sir W. R., K.C.B., (Bengal Fusileers), Calcutta,	1851
Gill, Capt. Robert (44th Madras N. I.), Jaulna,	1851
Gilmore, M. S. Esq. Civil service, Cuttack,	1844
Gilmore,† Allan, Esq. Merchant,	1837
Gilmore, W. F. Esq. Merchant, Calcutta,	1850
Gladstone,† Murray, Esq. Merchant,	1842
Gladstone,† Adam S. Esq. Merchant,	1840
Gobindchunder Sen, Baboo, Merchant Calcutta,	1850
Gobindchunder Dutt, Baboo, Merchant, Calcutta,	1851
Gooroochurn Sen, Baboo, Merchant, Calcutta,	1846
Gooroodoss Dutt, Baboo, Merchant, Calcutta,	1842
Gopaul Lall Tagore, Baboo, Merchant, Calcutta,	1850
Gordon, Thomas, Esq. Merchant, Mirzapore,	1846
Gouldhawke, J. Esq. Indigo planter, Rungpore,	1851
Gouldsbury, F. Esq. Civil service, Cuttack,	1843
Grant,† William Patrick, Esq.,	1835
Grant, John Peter, Esq. Civil service, Calcutta,	1836
Grant, Archibald, Esq. Attorney, Supreme Court, Calcutta,	1835
Grant, James, Esq. Civil service, Dinagepore,	1837
Grant, Thomas, Esq. Indigo planter, Bhaugulpore,	1848
Grant, Gregor, H. Esq. Indigo planter, Bhaugulpore,	1851
Gray, J. J. Esq. Indigo planter, Malda,	1846
Greenaway, William, Esq. Merchant, Calcutta,	1850
Greig, Alexander, Esq. Medical service, Lahore,	1844
Grey, J. R. Esq. Merchant, Calcutta,	1849
Griffiths, S. P. Esq. Merchant, Calcutta,	1844
Grote,* Arthur, Esq. Civil service, Calcutta,	1837
Gu[illegible]ins,† Charles, Esq. Civil service,	1833

	Admitted
Gubbins, F. B. Esq. Civil service, Benares,	1844
Gubbins, M. R. Esq. Civil service, Agra,	1842
Guise, Captain Henry J. (28th Regt. N. I.), Peshawur,	1844
Guise, R. C. Esq. Medical service, Meerut,	1850
Gulliver, Lieut. H. W. Bengal Engineers, Ferozepore,	1851
Gungapersaud Gossain, Baboo, Serampore,	1849
Gwatkin, Lieut.-Col. E. (23rd N. I.) Supt. of Studs, N. W. P., Haupur,	1850
HALKETT, Henry Craigie, Esq. Civil service, Cuttack,	1839
Hall, James M. Esq. Merchant, Calcutta,	1851
Halliday, John, Esq. Merchant, Akyab,	1849
Hamilton, R. N. C. Esq. Civil service, Resident at Indore,	1836
Hamilton, H. C. Esq. Civil service, Tumlook,	1851
Hammill, William, Esq. Merchant, Calcutta,	1844
Handscomb, Lieut.-Col. Isaac, (26th Light Infantry) Dinapore,	1846
Hankin, Lieut. G. C. Adjt. 6th Irr. Cavalry, Sealkote,	1851
Hannay, Major Simon Fraser, (40th Regiment N. I.) Commanding Assam Light Infantry, Jeypore,	1837
Hannyngton, Major John C. (24th Regiment N. I.) Deputy Commissioner, Chota Nagpore,	1837
Harrison, R. P. Esq. Civil service, Dacca,	1842
Harwood, W. L. Esq. Clerk to the Police Magistrates, Calcutta,	1851
Hastings, Lieut. the Hon'ble E. (32nd Regiment N. I.), Calcutta,	1846
Hathorn,† H. V. Esq. Civil service,	1844
Hawkins,*† John Abraham Francis, Esq. Civil service,	1837
Haworth, William, Esq. Merchant, Calcutta,	1851
Hearsey, Brigr. J. B. Commanding at Wuzeerabad,	1851
Heatly, S. G. T. Esq. Calcutta,	1841
Hedger, W. N. Esq. Attorney, Calcutta,	1842
Hemnauth Roy, Baboo, Merchant, Calcutta,	1845
Henderson,† Henry B. Esq. Merchant,	1839
Henley, T. F. Esq. Goosree,	1843
Hermanson, J. P. Esq. Indigo planter, Rungpore,	1847
Hewett, K. H. Esq. Chuppra,	1844
Hewett, G. Esq. Deputy Magistrate, Cutwa,	1848
Higgins, Lieut. G. E. (3rd Regt. N. I.) Jheelum,	1851
Higgins, Geo. Esq. Solicitor, Supreme Court, Calcutta,	1851
Higginson, J. B. Esq. Merchant, Mirzapore,	1837
Hills,* James, Esq. Senior, Indigo planter, Kishnagur,	1837
Hill, James, Esq. Merchant, Calcutta,	1842
Hill, Captain G. M. (17th Regiment N. I.) Deputy Pay Master, Jullundur,	1849
Hill, J. M. Esq. Indigo planter, Barrah factory, Tirhoot,	1850
Hill, Joseph, Esq., ditto, ditto,	1850

	Admitted
Hill, Geo. Esq. Acct. General's Office, Calcutta,	1851
Hodgson, Brian Haughton, Esq. Darjeeling,	1839
Hodgson, R. F. Esq. Civil service, Gya,	1847
Hogge, Major Charles (Artillery), Dum-Dum,	1840
Hollings, Charles, Esq. Sub-Depy. Opium Agent, Gya,	1841
Hollings, Captain G. E. (38th Regiment N. I.) Deputy Commissioner, Leia, Punjab,	1843
Holroyd, Lieut. Chas. Assistant Commissioner Assam, Gowhatti,	1849
Horee Mohun Sen, Baboo, Calcutta,	1837
Houghton, Major R. (63rd N. I.) Wuzeerabad,	1847
Huffnagle, Charles, Esq. Merchant, (Honorary Member),	1837
Hume, James, Esq. (Barrister,) Police Magistrate, Calcutta, (Honorary Member),	1839
Hunt, James, Esq. Railway Contractor, Calcutta,	1851
Hurreynarain Dey, Baboo, Merchant, Calcutta,	1844
Huthwaite, Lieut.-Colonel Edward, C.B., (Horse Artillery,) Loodianah,	1841
INCE, R. Esq. Salt Agent, Chittagong,	1848
Inglis, Henry, Esq. Sylhet,	1835
Inglis, J. Esq. Depy. Commr. Punjaub, Sealkote,	1851
JACKSON, C. C. Esq. Civil service, Meerut,	1843
Jadhubkissen Bahadoor, Rajah, Calcutta,	1850
James, Lieut. Hugh, Depy. Commr., Punjab, Peshawur.,	1846
James,† Capt. H. C. (32nd N. I.)	1842
Jenkins, Lieut. Col. Francis, Commissioner of Assam, and Governor General's Agent on the N. E. Frontier,	1828
Jennings, C. R. Esq. Indigo planter, Surdah,	1843
Johnson, P. Esq. Merchant, Calcutta,	1846
Johnson, John, Esq. Merchant, Calcutta,	1849
Johnson, J. C. Esq. Indigo planter, Purneah,	1851
Johnston, Brigadier J. Commg. Hingolee Division,	1850
Johnstone,† John, Esq. Merchant,	1849
Judge, Spencer, Esq. Solicitor, Supreme Court, Calcutta,	1843
KEARNES, D. H. Esq. Indigo planter, Hazrapore factory, viâ Jenida,	1843
Kelly, J. P. Esq. Medical service, Balasore,	1848
Kelsall, T. S. Esq. Merchant, Calcutta,	1837
Kerry, W. H. Esq. Indigo planter, Purneah,	1851
Kettlewell,† W. W. Esq. Merchant,	1837
Kettremohun Mookerjee, Baboo, Deputy Collector, Nattore,	1850
Killwick, F. A. Esq. Indigo planter, Purneah,	1850
King, Robert, Esq. Sub-Depy. Opium Agent, Patna,	1850
Kinleside, Major R. R. (Artillery,) Jullundur,	1847
Kirke, Captain H. (12th N. I.) Mooltan,	1837

	Admitted
Kistomohun Chowdry, Baboo, Zemindar, Guttaul,	1851
Knyvett, Capt. W. J. B. (38th Lt. Infantry,) Barrackpore,	1851
Laidlay,† J. W. Esq. Merchant,	1839
Lake, W. H. Esq. Merchant, Calcutta,	1843
Lall Beharee Dutt, Baboo, Merchant, Calcutta,	1847
Lamb, George, Esq. Medical service, Calcutta,	1829
Lamb, Capt. Wm. (51st N. I.) Lucknow,	1847
Landale, Walter, Esq. Indigo planter, Lutteepore factory, Bhaugulpore,	1851
Lane, Lieut.-Col. J. T., C.B., Comg. Artillery, Wuzeerabad,	1851
Lang, A. Esq. Civil service, Allahabad,	1841
Larmour, R. T. Esq. Indigo planter, Pubna,	1848
Larruleta,* A. Esq. Indigo planter, Jeygunge,	1837
Latter, Captain Thomas, (67th Regiment N. I.) Dinapore,	1838
Lautour, E. F. Esq. Civil service, Chittagong,	1847
Lautour, Edward, Esq. Civil service, Arrah,	1851
Lawrence, Lieut-Colonel Sir H. M., K.C.B., Lahore,	1840
Leach,*† Thomas, Esq. Merchant,	1835
Lee, H. J. Esq. Acct. Bank of Bengal, Calcutta,	1851
Leishman,† R. Esq.	1844
Lewis, W. T. Esq. Assistant Resident, Penang,	1840
Liebig,† Dr. Justus, Germany, (Honorary Member,)	1843
Lind, F. M. Esq. Civil service, Allahabad,	1851
Lloyd, Brigadier G. W. A., C. B., (28th Regiment N. I.) Comg. at Agra,	1838
Loch, T. C. Esq. Civil service, Beerbhoom,	1843
Login,* J. S. Esq. Medical service, Futteeghur,	1850
Longmore, W. J. Esq. Civil service, Maggoorah,	1851
Lowis, The Honorable John, Civil service, Calcutta,	1838
Lowth, Frederick, Esq. Civil service, Gya,	1839
Lowther,* Robert, Esq. Civil service, Allahabad,	1836
Loyd, Capt. W. K. Comdt. of Artillery, Aurungabad,	1850
Luke, William, Esq. Civil service, Midnapore,	1837
Lumsden, Lieut. P. S. Offg. Dy. Ast. Qr. Master General, Peshawur,	1851
Lushington, Edward, Esq. Civil service, Patna,	1848
Lushington, Henry, Esq. Junior, Civil service, Agra,	1851
Lyall,† John, Esq. Merchant,	1849
McArthur, Peter, Esq. Indigo planter, Malda,	1836
McCullum, D. Esq. Merchant Calcutta,	1845
McDonell, E. Esq. Sub-Deputy Opium Agent, Champarun, Tirhoot,	1842
Macgowan, D. J. Esq. M. D. Ningpo (Corresponding Member),	1851
Mackenzie, James J. Esq. Merchant, Calcutta,	1842
Mackenzie, H. Esq. Indigo planter, Jingergatchie, Jessore,	1850

	Admitted
Mackenzie, Lieut.-Col. J. (8th Lt. Cavalry,) Comg. 6th Irr. Cavalry, Sealkote,	1851
Mackenzie, Brigr. Colin (Madras Army), Comg. Ellichpore Division,	1851
Mackinlay, D. Esq. Merchant, Calcutta,	1851
Mackintosh, George G. Esq. Civil service, Calcutta,	1838
Mackintosh, Eneas, Esq. Indigo planter, Purneah,	1849
Mackintosh, A. B. Esq. Solicitor, Calcutta,	1850
Mackay,† J. Esq. (Honorary Member,)	
Maclagan,* Frederick, Esq. Indigo planter, Kishnagur,	1837
McLeod, Donald Frield, Esq. Civil service, Comr. Trans-Sutledge States,	1836
McLeod, C. Esq. Register, Political Dept., Calcutta,	1848
MacLeod, B. W. Esq. Medical service, Agra,	1849
McClelland, John, Esq. Medical service, Calcutta,	1848
MacNair, George, Esq. Indigo planter, Babookally factory, Jessore,	1851
Macpherson,*† George G. Esq.,	1836
Mactier, T. B. Esq. Civil service, Furreedpore,	1846
Maddock,† Sir T. H.,	1837
Maharaj* Dheraj Matabchund, Bahadoor, Rajah of Burdwan,	1836
Maharajah Shreeschunder Roy, Bahadoor, Nuddea,	1851
Maitland, J. Esq. M.D. 8th Nizam's Infantry, Lingsoogoor,	1851
Malet,† O. W. Esq. Civil service.	1846
Manickjee,* Rustomjee, Esq. Merchant, Calcutta,	1837
Mansell, Charles Grenville, Esq. C. S., Resident at Nagpore,	1837
Marks,† C. H. Esq. Merchant,	1848
Marquis, J. Esq. Indigo planter, Pubna,	1839
Marshman, J. C. Esq. Editor of the *Friend of India*, Serampore,	1829
Mason, Lieut. Monck, Political Agent, Kerowly,	1851
Martin, William, Esq. Trader, Darjeeling,	1851
Masters,* J. W. Esq. Asst. to Commr. of Assam, Nowgong,	1835
Mathie,* Lt.-Col. James, (33rd Regt. N. I.) Deputy Commissioner of Assam, Gowhatti,	1836
Mathews, A. H. Esq. Agent, Simla Bank, Simla,	1848
Maudubchunder Mullick, Baboo, Calcutta,	1849
Maxwell, Lieut. J. Harley, Bengal Engineers, Sealkote,	1851
Mayne, Major H. O. Nizam's Army, Ellichpore,	1851
Meik,† Captain Alexander, (H. M. 94th Regiment,)	1848
Mercer, G. G. Esq. Indigo planter, Eta,	1846
Mills,* Andrew John Moffat, Esq. Civil service, Calcutta,	1836
Molloy, R. Esq. Attorney, Calcutta,	1842
Monckton, H. Esq. Civil service, Punjaub,	1847
Monckton, E. H. C. Esq. Civil service, Humeerpore,	1851
Money,* William James Henry, Esq. Civil service, Burisaul,	1836
Money, David Inglis, Esq. Civil service, Berhampore,	1839
Montgomery, R. Esq. Civil service, Lahore,	1848

	Appointed
Mornay, H. Esq. Secretary Assam Company, Calcutta,	1843
Mornay, Stephen, Esq. Supt. Assam Tea Co.'s Plantations,	1851
Morton, C. E. Esq. Indigo planter, Malda,	1848
Morton, T. C. Esq. Barrister, Supreme Court, Calcutta,	1840
Morton, Lieutenant William Elliot, Bengal Engineers,	1851
Moses, Owen, Esq. Calcutta,	1851
Muir, W. Esq. Civil service, Agra,	1850
Munro,† Captain William, F.L.S., and F.B.E.S., (H. M. 39th Regiment,)	1838
Muspratt, J. R. Esq. Civil service, Jessore,	1847
Mutteelal Seal,* Baboo, Merchant, Calcutta,	1835
NAPLETON, Lieut.-Col. T. E. A. (13th N. I.), Delhi,	1841
Neame, A. C. Esq. Inspector of Customs, Calcutta,	1851
Nicholetts, Capt. W. H. Comg. Oude Local Infy. Seetapore,	
Nicol, F. A. M. Sugar Manufacturer, Dhoba,	1851
Nihal Sing, Sirdar, of Koopartollah, Jullunder,	1849
Nisbet,† Captain E. P. Commander of the *Agincourt*, (Associate Member,)	1843
Nurrender Kissen, Bahadoor, Rajah, Deputy Magistrate, Midnapore,	1851
O'BRIEN, Captain Wm. (8th Regt. Nizam's Infantry,) Aurungabad,	1846
Ommaney, M. C. Esq. Civil service, Jaunpore,	1840
Ouseley,† Captain R. (50th Regiment N. I.),	1845
Owen, Captain W. G. (11th Regiment Madras N. I.,) Vizianagram,	1846
Owen, J. C. Esq. Pilot service, Calcutta,	1847
PALMER, Brigadier Thomas, (72nd Regiment N. I.) Delhi,	1843
Palmer,† R. S. Esq. Merchant,	1844
Palmer, John Carrington, Esq. Merchant, Calcutta,	1842
Palmer,* Thomas, Esq. Merchant, Calcutta,	1838
Palmer, Charles, Esq. Medical service, Jessore,	1848
Parsons, Lieut.-Colonel James, C.B. (66th Regiment N. I.) Commandant Gwalior Contingent, Gwalior,	1838
Patton, W. Esq. Merchant, Moulmein,	1851
Payter,* J. W. Esq. Indigo planter, Bogorah,	1836
Pearychand Mittra, Baboo, Librarian, Public Library, Calcutta,	1847
Peel, The Honorable Sir Lawrence, Chief Justice, Supreme Court, Calcutta, (President,)	1842
Pereira, Francisco, Esq. Merchant, Calcutta,	1850
Perroux, A. C. Esq. Pakparah factory, Rajshaye,	1851
Peterson, A. T. T. Esq. Barrister, Supreme Court, Calcutta,	1849
Peyton, Capt. J. (Comg. 5th Regt. Nizam's Army,) Aurungabad,	1850

	Admitted
Sims, W. P. Esq. Supt. Lunatic Asylum, Calcutta,	1851
Sinclair, James, Esq. Accountant Oriental Bank, Calcutta,	1851
Sinclair, Lt. J. DeC. Comg. Artillery, United Malwa Contingent,	1851
Skinner, Capt. James, Comg. 14th Irregular Cavalry, Belaspore, viâ Secundrabad,	1851
Skinner, C. Bruce, Esq. Barrister at Law, Calcutta,	1851
Skipwith, F. Esq. Civil service, Sylhet,	1842
Sleeman, Lieut. Colonel William Henry, (1st Regiment N. I.) Resident at Lucknow,	1836
Small, James, Esq. Calcutta,	1843
Smith, Samuel, Esq. Proprietor of the *Hurkaru* Newspaper, Calcutta,	1835
Smith, George Henry, Esq. Civil service, Delhi,	1837
Smith,† Adam Freer, Esq. Merchant,	1841
Smith,† Edward, Esq. Merchant,	1849
Smith, Sidney George, Esq. Civil service, Banda,	1844
Smith, Major L. H. (6th Regiment Light Cavalry,) Meerut,	1849
Smith, Gow M. Esq. Indigo planter, Jessore,	1850
Smyth, Capt. J. H. Artillery, Jullundur,	1851
Speede, G. T. Frederick, Esq. Calcutta, (Associate Member,)	1837
Spottiswoode, Major A. C. (37th Regiment N. I.) Haupur,	1849
Squire, John, Esq. Medical service, Seonee,	1850
Sreekissen Sing, Baboo, Calcutta,	1835
Sreekissen Mullick, Baboo, Calcutta,	1838
Stalkartt, William, Esq. Merchant, Calcutta,	1845
Staples,† Capt. N. A. (Artillery,)	1847
Staunton, M. S. Esq. Assistant Military Auditor General's Office, Calcutta,	1836
Steers, Thomas, Esq. Merchant, Calcutta,	
Stephenson, R. M. Esq. Railway Commr. Calcutta,	1844
Stevenson,*† William, Esq. Junior, M.D.,	1834
Stewart,* Major W. M. (22nd N. I.) Agent Governor General, Benares,	1837
Stewart, Wm. McAdam, Esq. Merchant, Calcutta,	1851
Storm, William, Esq. Merchant, Calcutta,	1829
Stopford,† James Sydney, Esq. Merchant,	1837
Stopford, Robert, Esq. Merchant, Calcutta,	1848
Stowell, C. S. Esq. Merchant, Agra,	1839
Strickland,† R. S. Esq.,	1837
Strong, F. P. Esq. Medical service, Calcutta,	1827
Stuart,† James, Esq. Merchant,	1847
Sturgis,† Henry P. Esq. American Consul, Manilla,	1840
Sutherland, Patrick, Esq. Assistant Military Board Office, Calcutta,	1838
Sutherland, Charles J. Esq. Merchant, Calcutta,	1845
Sutt Churn Ghosaul, Rajah, Calcutta,	1838
Swatman, Major William, (65th Regiment N. I.) Lahore,	1845

	Admitted
Tarrucknauth Roy, Bahadoor, Baboo, Principal Sudder Aumeen, Maunbhoom,	1847
Taylor, George, Esq. Barrister at Law, Calcutta,	1845
Taylor, Capt. P. M. Nizam's service, Lingasuggoor,	1849
Teil, John, Esq. Kidderpore,	1846
Terry, W. Esq. Indigo planter, Midnapore,	1846
Thelwall, Capt. J. B., (H. M. 24th Regt.) Sealkote,	1851
Thiault, G. Esq. Merchant, Calcutta,	1851
Thomason, The Honorable James, Lieutenant Governor of the N. W. Provinces, Agra,	1831
Thomas, R. M. Esq. Solicitor, Calcutta,	1849
Thomson, R. Scott, Esq. Surgeon, Calcutta,	1838
Thomson, William, Esq. Merchant, Calcutta,	1848
Thompson, J. V. Esq. M.D., F.L.S., Deputy Inspector General of Hospitals, Sydney, (Corresponding Member,)	1840
Thompson, Captain Andrew, Calcutta,	1848
Thornton, John, Esq. Civil service, Agra,	1842
Thurburn,† R. V. Esq. Merchant,	1844
Tonnochy, Thomas, Esq. Deputy Collector, Bolundshuhur,	1843
Torrens, Henry, Esq. Civil service, Berhampore,	1846
Trauter, Geo. Esq. Medical service, Meheedpore,	1840
Trevor, Edward Tayler, Esq. Civil service,	1840
Troup, Capt. R. (63rd N. I.) Commandant 2nd Oude Local Infantry, Sultanpore,	1849
Tucker, Henry Carre, Esq. Civil service, Allahabad,	1837
Tucker, Henry Carre, Esq. Secy. for the time being Local Committee, Allahabad,	1851
Tulloh, C. R. Esq. Civil service, Mirzapore,	1841
Turnbull, Lieut. A. D. Bengal Engineers, Roorkee,	1851
Turner,*† Thos. Jacob, Esq. Civil service,	1836
Turner,† Alfred, Esq. Merchant,	1847
Twemlow, Brigadier George, Nizam's Army, Aurungabad	1841
Tynan, John, Esq. Calcutta,	1847
Varden, A. M. Esq. Merchant, Calcutta,	1851
Vetch, Major H. (54th Regt. N. I.) Asst. to Commissioner of Assam, Debroghur,	1842
Vincent, W. Esq. Indigo planter, Cawnpore,	1846
Vizianagram, Meerza Rajah Vizeram Guzputty Rauze Bahadoor, Rajah of	1847
Vos, J. M. Esq. Architect, Calcutta,	1847
Wallace, A. Esq. Merchant, Calcutta,	1843
Wallich,† N. Esq. M. D., (Honorary Member)	1820
Walters,*† Henry, Esq.,	1836
Warwick, B. Esq. Calcutta,	1849
Warwick, Chas. Esq. Merchant, Calcutta,	1850
Watson,† James, Esq. Merchant,	1850

	Admitted
Watson,* Robert, Esq. Calcutta,	1837
Wauchope, S. Esq. Civil service, Hooghly,	1848
Weld, Lt. Geo. Fort Adjutant, Chunar,	1851
Western, Major J. R. (Engineers,) Jullundur,	1849
West, C. H. Esq. Merchant, Lahore,	1850
Whampoa, Mr. Merchant, Singapore,	1850
Wienholt, W. Esq. Merchant, Calcutta,	1848
Wight,* Robert, Esq. M.D., Madras Medical service, Superintendent Government Cotton Plantations, Coimbatore,	1836
Wilby, G. R. Esq. Editor of the *Mofussillite*, Meerut,	1851
Williams, Fleetwood, Esq. Civil service, Bareilly,	1840
Williamson, Lieut. James, (49th Regt. N. I.) Dorunda,	1849
Willis, Joseph, Esq. Merchant, Calcutta,	1827
Wills, Augustin, Esq. Merchant, Calcutta,	1850
Wilson, A. G. Esq. Deputy Magistrate, Gyah,	1847
Wilson, Thomas, Esq. Deputy Opium Agent, Gazeepore,	1848
Wilson, J. C. Esq. Civil service, Moradabad,	1851
Wingrove, E. Esq. Merchant, Calcutta,	1846
Withecombe, J. R. Esq. Civil Asst. Surgeon, Darjeeling,	1851
Wodehouse,† The Honorable P. E. Ceylon Civil service,	1846
Wood, Browne, Esq. Assam,	1848
Wood, W. H. J. Esq. Merchant, Calcutta,	1851
Woodcock,† T. Parry, Esq. Civil service,	1841
Woodcock, E. E. Esq. Civil service, Maldah,	1840
Woomeschunder Ghose, Baboo, Merchant, Calcutta,	1851
Wray,† L. Esq.,	1840
Wyatt, Thomas, Esq. Civil service, Rungpore,	1836
Wyatt, G. N. Esq. Indigo planter, Champarun,	1848
Wyatt, S. G. Esq. Office of Accounts, Treasury,	1851
Wyld, Capt. W. 4th Lancers, Sealkote,	1851
Wylie, Macleod, Esq. Barrister, Supreme Court, Calcutta,	1844
Young, G. L. Esq. Indigo planter, Midnapore,	1845
Young,† Robert, Esq.,	1850
Young, R. H. Esq. Indigo planter, Baraset,	1851

PROPOSED NEW GARDEN

OF THE

AGRICULTURAL AND HORTICULTURAL SOCIETY.

It is purposed to establish a new Garden of the Agricultural and Horticultural Society of India, as near to Calcutta as possible, on the Calcutta side of the river, and on its banks, if adequate funds, and a convenient site, can be obtained. A situation on the river is deemed preferable to any other, as well for the animation and additional beauty which the river gives to a garden so placed, as for the convenience of water-carriage.

In case the funds are inadequate for that more costly site, or a good site on the banks of the river cannot be procured, then it is proposed to place the Garden on the most fit and convenient site that can be obtained elsewhere, in the immediate vicinity of Calcutta.

The Society has assented to the appropriation of Twelve Thousand Company's Rupees, out of its accumulated Capital of Co.'s Rs. 22,000, to the formation of this new Garden, which assent was manifested by a nearly unanimous vote at a very numerous Meeting of the Members of the Society, who are resident in or near Calcutta. The Members of the Society resident in the Mofussil have been asked to express their views on the subject of the proposed change, and the opinions of a great majority of those who have expressed any on the subject, are also favorable to the change.

It is confidently expected that this Garden will be in every way worthy of the Society; that the establishment of it will promote in many ways the progress of the science of Horticulture, as well in its more important branches, as in the less important, but more attractive, branch of Floriculture. The Garden will be constantly open to the observation of the Members of the Society, and its Governing Body, and of the public generally; and opportunities will thus be constantly afforded of comparing cultivation there, with cultivation elsewhere, and the practical cultivators will thus steadily obtain instruction, whilst, it is hoped that the Garden will be henceforth, under skilled Superintendents, a Training School of Gardeners and Cultivators. Whilst advancing the objects of the Society, it is desired to give to the public generally a resort to a near and pleasant place of recreation, which Calcutta greatly needs. This is particularly needed for families;—and, subject to the ordinary restraints against any abuse of the privilege, it is proposed to give the public generally a free admission to the Garden at all convenient hours and times.

To accomplish these ends, the Members of the Society individually and the public are respectfully solicited to increase the sum appropriated by the Society, by their usual liberal contributions to works of utility.

List of Donations towards the Proposed New Garden.

	The Society,	Co.'s Rs. 12,000
	The Most Noble the Marquis of Dalhousie,	500
	The Hon'ble Sir Lawrence Peel,	2,000
Through Dr. Falconer.	The Hon'ble Sir J. W. Colvile,	500
	The Hon'ble Sir Arthur Buller,	100
	Dr. H. Falconer,	250
	A Friend to the Move,	250
	Lieut.-Col. Mackeson, C.B.,	100
	Major G. T. Marshall,	16
	Dr. R. O'Shaughnessy,	50
	Dr. J. Jackson,	50
	H. Balfour, Esq. C.S.,	16
	Major W. E. Baker,	50
	Capt. H. L. Thomas,	50
	Thos. Oldham, Esq.,	20
	Capt. Thos. Martin,	20
	Capt. A. Sanders,	20
	C. A. Cantor, Esq.,	32
	T. Caird, Esq.,	16
	Peter Anderson, Esq.,	16
Through H. Alexander, Esq.	H. Alexander, Esq. C.S.,	100
	Charles Jenkins, Esq. C.S.,	50
	Principal Kay,	25
	The Rev. A. Garstin,	16
	Dr. E. Roer,	16
	Carried over,	Co.'s Rs. 16,263

Brought forward, .. Co.'s Rs. 16,263

Through Lieut.-Col. Sage.	Lt.-Col. W. Sage,	100
	Sir John Littler, G.C.B.,	50
	Henry Ricketts, Esq. C.S.,	200
	Col. W. N. Forbes,	50
	Capt. Champneys,	50
	Sir W. R. Gilbert, G.C.B,	100
	Major Bygrave,	36
	Lt.-Col. Goldie,	50
	Capt. J. S. Banks,	50
	Sir J. Thomson,	50
	A. Moffat Mills, Esq. C.S.,	25
	Capt. H. L. Thuillier,	25
	W. Maples, Esq. C-S.,	25
	H. Walker, Esq.,	25
	Dr. Allan Webb,	25
Through A. Grote, Esq.	A. Grote, Esq. C.S.,	100
	E. Currie, Esq. C.S.,	50
	J. R. Colvin, Esq. C.S.,	50
	C. Allen, Esq. C.S.,	25
	E. A. Samuells, Esq. C.S.,	25
	E. Bentall, Esq. C.S.,	25
	J. S. Torrens, Esq. C.S.,	15
	T. Bruce, Esq. C.S.,	25
	Sir F. Currie,	100
Through W. Earle, Esq.	R. S. Thomson, Esq.,	100
	R. Diggles, Esq.,	100
	W. McAdam Stewart, Esq.,	100
	D. Mackinlay, Esq.,	200
	John Bullen, Esq.,	50
Through W. G. Rose, Esq.	W. G. Rose, Esq.,	100
	A. M. Varden, Esq.,	100
	W. H. Poe, Esq.,	50
	A. B. Mackintosh, Esq.,	32
	R. C. Bell, Esq.,	32
	R. Molloy, Esq.,	20
	F. Maclagan, Esq.,	20
	Geo. Macnair, Esq.,	20

Carried over, .. Co.'s Rs. 18,463

	Brought forward, .. Co.'s Rs.	18,463
Through Baboo Peary Chand Mittra.	Baboo Prosonnonauth Roy,	32
	Baboo Nilmoney Bysak,	10
	Baboo Shibchunder Deb,	20
	Baboo Gobindpersaud Pundit,	25
	Baboo Nobogopaul Bose,	5
	X. Y. Z.,	15
Through John Bean, Esq.	John Bean, Esq., Monghyr,	16
	Rajah Jye Mungul Sing,	100
	Baboo Lalljee Saho,	10
	Baboo Leo Saho,	10
	Rajah Nirbhy Sing,	100
	Shah Mahomed Eassun,	25
	Rajah Leelamund Sing,	150
	Pundit Jyeperkoss Missir,	31
	Rajah Narcuda Krishna Bahadoor,	100
	E. DeLautour, Esq., C.S., Arrah,	10
	Dr. James Allan, Bauglepore,	32
	Lieut. John Eliot, (Artillery),	10
	Capt. W. Owen, (6 Madras N. I.),	32
	W. H. Elliott, Esq. C.S.,	100
	Henry E. Brae, Esq.,	20
	D. F. McLeod, Esq. C.S.,	100
Through Rajah Pertap Chunder Sing.	Rajah Pertap Chunder Sing,	500
	Baboo Prosono Coomar Tagore,	200
	Rajah Suttchurn Ghosall,	50
	Baboo Rajendur Dutt,	25
	Baboo Peary Mohun Chowdry,	30
	Messrs. John Teil and Co. Kidderpore,	1,000
	W. Grey, Esq. C.S.,	100
	George Hewett, Esq Cutwa,	20
	R. Watson, Esq.,	50
	R. Dodd, Esq.,	50
Through W. Earle, Esq.	J. R. Grey, Esq..	50
	Baboo Gooroochurn Sen,	50
	Wm. Hammill, Esq.,	32
	H. Crooke, Esq.,	50
	Carried over, .. Co.'s Rs.	21,623

	Brought forward, .. Co.'s Rs.	21,623
	Geo. Grant, Esq.,	10
	Small sums of 5, 3 and 2 Rs. from eight parties, through Mr. G. Grant,	27
Through J. Church, Esq., Senior.	James Church, Esq. Senior,	100
	David Jardine, Esq.,	250
	C. B. Skinner, Esq.,	50
	Messrs. Gordon, Stuart and Co.,	100
	John Rennie, Esq.,	25
	J. Lyall, Esq.,	25
	H. E. Braddon, Esq.,	32
	C. Church, Esq.,	32
	R. S. Palmer, Esq.,	32
	J. J. Mackenzie, Esq.,	50
	Hugh McEwen, Esq.,	32
	R. J. Eglinton, Esq.,	16
	E. Cowell, Esq.,	32
	H. W. Withers, Esq.,	32
	Geo. Barton, Esq.,	25
	J. S. Elliot, Esq.,	20
	J. P. McKilligin, Esq.,	25
	W. F. Gilmore, Esq.,	25
	F. Pereira, Esq.,	25
	E. J. Daniell, Esq.,	10
	Capt. F. C. Burnett, Artillery,	50
	Baboo Ram Gopaul Ghose,	100
	George Higgins, Esq.,	100
	Sremutty Rausmoney Dossee, (Widow of Rajchunder Doss,)	250
	W. Vincent, Esq.,	10
	Lieut.-Col. H. C. M. Cox,	10
	Capt. J. R. Western, Engineers,	50
	W. R. Jones, Esq., Purneah,	25
	Total, .. Co.'s Rs.	23,193

CALCUTTA: *June*, 1852.

Universal Assurance Society for Lives,

EMPOWERED BY SPECIAL ACT OF PARLIAMENT.

ESTABLISHED IN LONDON AND CALCUTTA, 1834.

Capital £500,000 in 5,000 Shares of £100 each.

Indian Branch.

DIRECTORS.

C. R. Prinsep, Esq.
W. H. Smoult, Esq.
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W. Grey, Esq.
James Norman, Esq.

AUDITORS.

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TREASURERS.

Bank of Bengal.

SOLICITORS.

Messrs. Sandes & Watts.

AGENTS AND SECRETARIES.

Messrs. Braddon and Co.

MADRAS.

Agents

Messrs. Bainbridge and Co.

BOMBAY.

Agents.

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ADVANTAGES OFFERED BY THIS SOCIETY.

1.—The profits are declared in each year on the second Wednesday in May, from which date all Persons who may have assured for the whole term of life, on the participating scale, and on whose Policies six complete annual or twelve complete half-yearly original premiums have been paid, are entitled to participate in the profits of succeeding years in either of the modes provided by the Deed of Settlement, viz. by a reduction of the annual or half yearly premiums as they fall due, or by an equivalent addition to the sum assured by way of a Bonus. Each Assurer on his first becoming entitled to participate in the profits has the option of selecting either of the foregoing methods, and three months from the date of declaration of the profits is allowed for his making that selection, which, however, when once determined on, cannot be altered in after years.

2.—One-fifth of the ascertained profits is divided between the Policy-holders and Shareholders,—three fourths to the former, and one-fourth to the latter—the remaining four-fifths are set apart to enter into the average to be struck on the next succeeding year.

3.—The following table will show the operation of the reduction allowed by the division of profits for 1851, which is equivalent to 45 per cent. on the current annual premium of all Policies entitled to participation.

Age next birthday when Policy was issued.	Date of Policy previous to the 2nd Wednesday.	Sum Assured.	Original Premium.	Reduction.	Annual Premium payable after deduction.
		Co.'s Rs.	Co.'s Rs.	Co.'s Rs.	Co.'s Rs.
20	May, 1846	10,000	420	189 0 0	231 0 0
30	„	10,000	480	216 0 0	264 0 0
40	„	10,000	590	265 8 0	324 8 0
50	„	10,000	740	333 0 0	407 0 0
60	„	10,000	1,030	463 8 0	566 8 0

4.—From the foregoing explanations it will be seen that the benefits arising from a participation in the profits are actually experienced (when a reduction of the premium is selected) at the periods when the seventh annual or thirteenth and fourteenth half-yearly premiums fall due. In the case, however, of a Bonus to the sum assured being selected, an equivalent sum will be added to the Policy for the current year, being such an amount as the reduction in the premium would purchase as a single payment.

5.—Separate tables for Assurances without participation in profits, both Civil and Military, have been adopted for the whole of Life, at reduced rates, for such persons as may prefer a lower rate of premium to participation in the general profits.

6.—In all cases of return of the Assured to Europe for a *permanent residence*, they will be entitled in paying their future *annual* premiums to fall back on the English rates for the age at which they originally assured without reference to the number of payments made in India.

7.—Parties visiting England on *Furlough*, or for a *temporary residence*, will be required to pay the Indian premium during residence in England, without reference to the number of years the same may previously have been paid in India.

8.—In all cases of reduction to the English rate, the Policies are to be subject to all the regulations and conditions affecting English Policies.

9.—When application is made for assuring a life subject to more than ordinary hazard, an augmented premium will be charged proportionate to the increased risk, the rate of which will be regulated by the strictest attention to justice between the Society and the Assured, according to circumstances.

10.—The Parent Institution being in London, with a similar establishment in Calcutta, for granting Policies, premiums as well as claims are payable in either country at the option of the Policy-holder. The appointment of Sub-Committees at Madras and Bombay, with power to grant Policies affords similar facilities to persons residing at either of the sister Presidencies.

11.—All Policies becoming claims on the Society will be discharged within three months after satisfactory proof of the death, and cause of death, of the Assured shall have been furnished to the Directors either in London or Calcutta.

12.—The Directors of the Indian Branch of the Society are empowered to treat for the purchase of Policies for the whole term of Life on which premium shall have been paid for a period of not less than five years, or to advance, if required, on such Policies, by way of loan, two-thirds of the estimated value.

13.—All applications for Assurance must be accompanied by a Medical Fee of eight rupees.

14.—The Tables, Blank Forms, and other particulars, requisite to enable persons to effect Assurances, may be had on application to the Agents.

By Order of the Directors,

BRADDON AND CO., *Agents and Secys.*

Calcutta : June, 1852.

A List of Terrestrial and Epiphytical Orchids found in Assam and the neighbouring Hills.

No				
1		Oberonia iridifolia, ..	Epi	Hills.
2		—— species, ..	Ditto	Ditto.
3	**	Liparis bracteata, ..	Ditto.	U A.
4	**	—— concinna, ..	Ditto	Ditto.
5	**	—— anceps, ..	Ditto.	Ditto.
6	*	—— cylindrostachya, ...	Ditto.	Ditto.
7		—— longipes, ..	Ditto	Ditto.
8		Otochilus fuscus, ..	Ditto.	Ditto.
9		—— species, ..	Ditto.	Ditto
10		Pholidota imbricata,	Ditto	Ditto.
11		—— undulata,	Ditto	Ditto.
12	*	—— articulata,	Ditto.	Ditto.
13	**	—— 3 species, (new)	Ditto	Ditto.
14		Cœlogyne flavida, ..	Ditto.	Ditto.
15		—— undulata,	Ditto.	Ditto.
16	**	—— fimbriata,	Ditto.	Ditto.
17	**	—— barbata, ..	Ditto	Ditto.
18	*	—— longicaulis,	Ditto	Ditto.
19	**	—— procera, ..	Ditto	Ditto.
20		—— cristata, ..	Ditto	Ditto.
21	**	—— rigida, ..	Ditto	Ditto.
22	*	—— Wallichiana, ...	Ditto.	Ditto.
23	*	—— præcox, ..	Ditto	Ditto.
24	**	—— maculata,	Ditto	Ditto.
25		—— prolifera,	Ditto	Ditto.
26	*	—— nitida, ..	Ditto.	Ditto.
27	*	—— ocellata, ..	Ditto.	Ditto.
28	**	—— media, ..	Ditto.	Ditto.
29	**	—— eleta, ..	Ditto	Ditto.
30		—— ovalis, ..	Ditto.	Ditto
31	**	—— Gardneriana, ...	Ditto.	Ditto.
32	**	Trichamas suavis, ..	Ditto.	Ditto.
33	*	Bolbophyllum umbellatum, ...	Ditto.	Ditto.
34	**	—— Careyanium, ...	Ditto	Ditto.
35	*	—— flexuosum, ...	Ditto.	Ditto.
36	*	—— Jenkinsii, ...	Ditto.	Ditto.
37	*	Cirrhopetalum cœspitosum, ...	Ditto	Ditto.
38	*	—— cornutum, ...	Ditto.	Ditto.
39		—— macrophyllum, ..	Ditto.	Ditto
40	**	Trias, ...	Ditto.	Ditto.
41	*	Eria paniculata, ..	Ditto.	Ditto.
42		—— flava, ...	Ditto.	Ditto.
43	**	—— pusilla, ..	Ditto.	Ditto.
44	**	—— densiflora, ..	Ditto.	Ditto.
45	**	—— clavicaulis, ..	Ditto.	Ditto.
46	**	—— planicaulis, ..	Ditto.	Ditto
47		—— ferruginea, ..	Ditto.	Ditto.
48	**	Eria convallaroides,	Epi.	Hills
49	**	—— spec. fl. large, rose colored, ..	Ditto.	Ditto.
50		Aporum anceps, .	Ditto.	plains
51	*	—— Jenkinsii, ..	Ditto.	Ditto
52		—— ancinaciforme,	Ditto.	Hills.
53		Dendrobium Pieradi, ...	Ditto.	plains
54	**	—— heterocarpum, ...	Ditto	Hills.
55	*	—— Paxtonii, ..	Ditto.	Ditto
56	*	—— fimbriatum, ...	Ditto.	Ditto.
57	*	—— longicornu,	Ditto	Ditto
58	*	—— formosum,	Ditto.	Ditto
59	**	—— intermedium, Nov. spec., ..	Ditto	Ditto.
60	**	—— pulchellum,	Ditto.	Ditto
61	**	—— Nov. species, ...	Ditto.	Ditto.
62		—— calceolus, ..	Ditto.	Ditto.
63	*	—— densiflorum	Ditto.	Ditto.
64	**	—— sulcatum,	Ditto.	Ditto
65	**	—— bicameratum, ...	Ditto.	Ditto.
66	*	—— Jenkinsii,	Ditto.	Ditto.
67		—— cœrolescens, ...	Ditto.	Ditto.
68		—— nobile, ..	Ditto.	Ditto
69	*	—— Gibsonii, ..	Ditto.	Ditto
70	**	—— candidum,	Ditto.	Ditto.
71	**	—— stuposum,	Ditto	Ditto
72	*	—— Cambridgeanum, ...	Ditto.	Ditto
73	**	—— clavatum,	Ditto.	Ditto
74	**	—— Dalhousianum, ...	Ditto.	Ditto.
75	**	—— Devonianum, ...	Ditto.	Ditto.
76	**	—— Farmerii, ..	Ditto.	Ditto.
77	**	—— Griffithii, ..	Ditto.	Ditto
78	**	—— transparens, ...	Ditto	Ditto.
79	**	—— densiflorum pallidum, ..	Ditto.	Ditto
80	**	—— Do. like above, but rose-colored, ...	Ditto.	Ditto.
81	*	—— multicaule,	Ditto.	Ditto.
82	**	—— amœnum,	Ditto.	Ditto.
83	**	Spathoglottis pubescens, ...	Ter.	Ditto.
84		Arundina bambusifolia, ...	do.	do. & plains
85	*	Phaius grandifolius,	Ditto.	Ditto.
86		—— Wallichii, ..	Ditto.	Ditto.
87	*	—— albus, ..	Ditto.	Ditto.

88	**	Phaius maculatus, ..	Ter	Hls.& plains
89	*	Apaturia senilis, ..	Ditto	plains
90	*	Eulophia virens, ..	Ditto	Ditto.
91		Vanda teres, ..	Ditto.	Ditto.
92	*	——— cristata, ..	Ditto.	Hills
93	*	——— Nov. Spec. yellow, streaked with brown, ..	Ditto	Ditto.
94		——— Ditto, dull purple, ...	Ditto	Ditto
95		Camarotis purpurea,	Ditto	Ditto.
96	*	Micropera pallida, ..	Ditto.	Do. & plains
97		Saccolabium retusum, ...	Ditto	plains
98		—— micranthum, ...	Ditto.	Hills.
99	**	— ——— rigidum,	Ditto	Ditto
100	**	——— carinatum, ...	Ditto	Ditto.
101	**	— — — calceolare,	Ditto.	Ditto
102	**	– — — curvifolium, ...	Ditto.	Ditto.
103	**	Sarcanthus juncens,	Ditto	plains
104	**	— ——— affinis, ..	Ditto.	Ditto
105	**	— ——— oxyphyllus, ...	Epi.	Ditto
106	*	Agrostophyllum Khasyanum, ..	Ditto	Hills.
107	*	Œceoclades ampullacea, ...	Ditto	Ditto.
108		Ærides affinè, ..	Ditto	Do. & plains
109	*	———multiflorum,	Ditto	plains
110	**	— ——suaveolens,	Ditto	Ditto
111		—— ——odoratum,..	Ditto.	Ditto.
112	**	——— refractum,..	Ditto	Ditto
113	*	Xiphosium acuminatum.	Ditto.	Hills.
114	**	Acanthephippium silhetense, ...	Ter.	plains
115	*	Cymbidium giganteum, ...	Epi	Hills.
116	*	——— lancifolium,	Ditto.	Ditto.
117		— — — aloifolium,	Ditto.	plains
118		——— pendulum,	Ditto	Ditto.
119	*	— - - Eburneum, Fl. very large, ..	Ditto	Hills
120	*	—— —— inconspicuum, ...	Ditto.	Ditto
121	*	——— longipetalum, ...	Ditto	Ditto
122		Euproboscis pygmæa, ...	Ditto	Ditto.
123	*	Geodorum dilatatum	Ter.	plains
124	*	——— candium, ..	Ditto.	Ditto.
125	*	Calanthe densiflora,	Ditto	Ditto.
126		Platanthera spec., ..	Ditto.	Ditto.
127		Peristylus elatus, ..	Ditto	Ditto
128		- spec., ..	Ditto	Ditto.
129	*	Habenaria ovigera, ..	Ditto	Ditto
130	**	--- 4 new species, ...	Ditto	Ditto
131	**	Pogonia, 2 species, ..	Ditto	Ditto.
132	*	Cyrtosia, ...	Ditto	Gowhatty
133	*	Spiranthes, ..	Ditto.	Nowgong
134		Zeuxine sulcatta, ..	Ditto	Ditto.
135	**	Anœctochilus Roxburghii, ..	Ditto	Hills
136	**	—— - — 2 new species, ...	Ditto	Ditto
137	**	Sypripedium venustum, ...	Ditto	Ditto
138	**	——— insigne	Ditto	Ditto.

N B.—Plants not marked are common.

Ditto marked with an asterisk are found less frequently, and are consequently considered as somewhat rare

Ditto with two asterisks are seldom brought in, and are consequently considered very rare.

Plants of large growth, such as Dendrobiums, &c. are generally in bunches, having from 5 to 10 stems, or more

Middling sized ones such as Ærides, Vanda, Saccolabiums, &c. have two or three stems twined together, and so form one plant.

The smaller ones with pseudo-bulbs, such as Cœlogyne, Bolbophyllum, &c. have generally 10 to 20 stems or more growing together, and are considered as one plant.

The charges will be (£5) 50 Rupees for a box measuring 3 Cubic feet, containing a variety of (1 or 2 of each species) 40 to 50 plants of the larger or 50 to 80 of the middling and smaller kinds, inclusive of package and freight to Calcutta

If less than a box is taken and the more rare required only—then the charges will be for a single plant of the common kind,(2 shillings) one Rupee. The rare and very rare in proportion If any new plants, not discovered before, are sent, and which are not included in the list above, a separate charge will be made.

A liberal allowance made by the addition of more of the rare kinds, when more than two boxes are taken.

Apply to Messrs Charles Cantor and Co, in Calcutta, who will receive orders for Orchids from Assam, and the Hills in the vicinity.

GOWHATTY: *May*, 1850

THE JOURNAL

OF THE

Agricultural & Horticultural Society

OF

INDIA.

On the Plant yielding the "Rice-Paper" of China. *By* W. T. Lewis, Esq.

I have frequently remarked the similarity to *Rice-Paper* of a substance in common use among the Malays and Siamese in making their artificial flowers, and on examination am convinced that I am right in conjecturing that it is the same; I have therefore procured some of the plant, which is very abundant on all the sea coasts of the Malayan Archipelago, and find it to be the Scævola Taccada of Roxburgh.

Dr. Lindley in his "Natural System of Botany" places Scævolacæ in the 183rd Order of Exogens, and states the properties to be *unknown.* In his "Introduction to Botany" Dr. L. refers to a *Rice-Paper* plant, but does not enlighten us further, and it would appear that so late as 1849 "Sirr," in his "China and the Chinese," although he found out it was erroneously called *Rice* Paper, was himself led astray, and states it to be *made "from the fine inner bark of a tree!"*

The plant does not grow to a larger size than the thickest part of a man's calf, and is seldom seen as high as eight feet as Roxburgh describes it.

The pith is the part used, and as it is singularly abundant and delicately white (which quality it retains) it seems well adapted for the purpose of forming artificial flowers, and for painting flowers, as it gives them a velvetty and highly finished appearance.

Only one or two Chinese of this place have been able to give me any certain information of this paper, and from their accounts I am enabled to afford a pretty satisfactory description of the process of preparing the pith for use.

It is not plentiful in the coasts of China, but is imported from the Island of Formosa in pieces of 4 to 6 feet in length. As the wood becomes dry during the voyage, it is obliged to be soaked.

The outer parts (bark and wood greatly resembling the Elder plant) are taken off, when a sharp instrument from 10 to 12 inches long, and about 4 inches broad, is employed for slicing the pith carefully,—and by an experienced hand—as thin as requisite, and then flattened out.

This paper is mostly made in Chuan-Choo, and the Chinese call the plant "Chow." It is known in Malay countries as the "Ambong, Ambong."

PENANG: 1*st May*, 1852.

P. S.—I send you a few pieces.

Remarks on Scævola Taccada, quoad Rice-Paper. By DR. FALCONER.

The nature of the substance, brought from China, under the name of *Rice-Paper*, has long been well-known. Sir David Brewster, in a paper communicated to the Royal Society of Edinburgh in 1822, "On the structure of *Rice-Paper*," shewed by a microscopical inquiry, that it was a vegetable organization, and not a material formed by art. He found that it consists of a uniform texture composed of long hexagonal cells, the walls of which are of a very delicate membrane: the long diameter of the cells being parallel to the surface of the film, and the cells filled with air, which circumstance causes the peculiar softness that renders the material so well adapted for the purposes to which it is applied.* This structure, is entirely identical with that of the pith of plants, when largely developed, as in the case of the common *Elder*.

But although the nature of the material has been well ascertained, the greatest doubts have existed until lately, as to the particular species of plant yielding it. In Brewster's paper, above referred to, it was stated, on information derived from China that it was believed to be a membrane of the bread-fruit tree, *Artocarpus incisa;* and in 1841, when the article upon *Rice-Paper* in the "Penny Cyclopædia" was published, nothing more satisfactory was known regarding it, although Botanists generally believed that it was a kind of sliced pith, and not a natural membrane.

From the agreement generally, of "*Rice-paper*" with the structure of the well-known "*Shola*" of this country, *Æschynomene paludosa*, it has been conjectured by various writers, and even asserted by some travellers in China, that *Rice-Paper* was yielded by the "*Shola*" plant. In one instance the analogy of the two was adduced as a collateral argument in favor of the tea plant being grown in India. But a careful comparison of the two materials, shows a very palpable difference. The "*Shola*" pith is much coarser in the fabric, and it never shows the pure white colour yielded by *Rice-Paper*.

Mr. J. Reeves, so well-known for various researches in connexion with the vegetable products of China, took with him to England a Chinese drawing, supposed to be of the *Rice-Paper Plant.* Unfortunately, neither flower nor fruit was represented, so as to admit of any precise determination, and the plant was vaguely conjectured to be either *Malvaceous* or *Araliaceous.* The expedition to China, during the war of 1840-41, did not clear up the mystery which enveloped the *Rice-Paper* plant, nor was Mr. Fortune, the intelligent traveller, more successeful in determining what it was.

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* Brewster's *Edin. Jour. of Science*; vol. ii. p. 135.

In the January number of the "Journal of Botany"* of 1850, Sir William Hooker gave some interesting particulars regarding the material, from specimens and information communicated by Mr. J. H. Layton, the British Consul at Amoy. It is there stated that "the substance called "*Rice-Paper*" is made from the pith of a plant or tree, which grows principally in the swampy ground of *Sam-swi,* on the northern part of the island of Formosa, where it is said to form large forests. The bark and rind are, previous to exportation, stripped from the pith, which is then called *Bok-shima.*

In a subsequent number of the same Journal, (for August 1850,) Sir W. Hooker gives some further particulars regarding the *Rice-Paper* plant, founded on "a thin volume of well executed drawings by a Chinese artist on *Rice-Paper,*—the said drawings exhibiting the several states or conditions of the *Rice-Paper* plant, from the preparation of the seed to the packing of the material for exportation," received from Mr. C. J. Braine, a British merchant of Hong-kong. Sir William gives copies of two of the series of 11 drawings, the one exhibiting the growing plant, and the other the process of converting the pith into sheets of *paper.* These drawings are thoroughly Chinese. The first is palpably a pictorial myth, and, as Sir William frankly states, is "of so strange a character, that no Botanist to whom we have shown it can conjecture to what family it may belong." The figure represents a group of huge flattened stalks like "gigantic heads of Asparagus," surmounted by a cockscomb kind of crop, of aggregated broad Typha—(Hoogla)—looking leaves. The other drawing appears also to be exaggerated, as it represents a *log* of pith 6 or 8 feet in length, with detached truncheons, each of them as thick as the thigh, undergoing the operation of being sliced up into sheets: whereas, the largest piece of bared pith, received by Sir W. Hooker, did not exceed three fingers breadth, (or about 2½ inches) in diameter.

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* Hooker's *Journal of Botany;* p. 27.

The latest accessible information regarding the *Rice-Paper* plant, is contained in the following extract of the "Gardener's Magazine of Botany." New series Part 3, March 1852, p. 41:—

"The Chinese *Rice-Paper* plant, of which so much has been conjectured, and so little hitherto known by Europeans, proves to be a tree of the Araliaceous family, and has been named *Aralia (?) papyrifera* by Sir W. J. Hooker, in the "Journal of Botany." It is a "good sized" tree, occurring apparently only on swampy ground, in the northern parts of the Island of Formosa. The pith, which occupies a very large space, and is beautifully white, is the part from which the *Rice-paper* is cut in thin sheets. The leaves of the plant are very large, palmate, not unlike those of a Sycamore, and clothed beneath with brownish stellate tomentum. It would appear that a living plant, sent many years ago by J. Reeves, Esq., of Clapham, to the Horticultural Society, arrived alive, but soon died. An attempt recently made by Mr. Layton, to introduce a living plant for Sir W. Hooker, has also failed, but the remains have sufficed for the determination of the real nature and affinities of the species, which before were entirely problematical to European naturalists."

The account of the young plant as given in the above extract, is in many respects confirmatory of that represented in Mr. Reeve's Chinese drawing; and it would go far to prove that Mr. Lewis's conjecture regarding "*Scævola Taccada,*" as the source of *Rice-Paper,* is erroneous. But the proof would appear as yet to be inconclusive, and it will remain so till it is shown that the pith of the provisionally named *Aralia (?) papyrifera* is capable of yielding the material. For the Chinese are proverbially addicted to palming off spurious plants upon their European customers for a consideration: time and further experience will shew whether or no this *ruse* has been practised on the British Consul at Amoy, in this instance.

Scævola Taccada, advanced by Mr. Lewis, in his communication, as the plant which yields *Rice-Paper,* differs so much in every respect, from the *Aralia (?) papyrifera,* as described by Hooker, that it is hardly possible that the one could, in any case, be confounded with the other. They belong respectively to natural families that are very wide apart, and their foliage and habit are very distinct. The *Scævola* yields a pith which is very abundant, beautifully white and delicate, and in no respect inferior, so far as the texture is concerned, to the best Chinese *Rice-Paper.* I have examined, the specimens sent by Mr. Lewis, both of the *Scævola* pith and of *Rice-Paper,* under the microscope, using corresponding sections, and I find that they agree so closely, as to be nearly undistinguishable. They both consist of hexagonal cells of nearly the same size and corresponding proportions, as regards their different diameters. The cell membrane is equally delicate in both, and the whiteness and softness are, if anything, in favour of the *Taccada* pith. But this close agreement in physical character will not establish the *identity* of the plants yielding the Malay and the Chinese kinds of pith, nor even their near affinity. In one important respect, so far as the specimens yet show, the *Taccada* pith, for all practical applications, is greatly inferior to the Chinese or Formosa *Rice-*

Paper pith. In none of the shoots, transmitted by Mr. Lewis, does the pith attain an inch in diameter, the largest core being about $\frac{7}{10}$ inch, whereas Sir William Hooker has seen China *Rice-Paper* pith, 2½ inches thick. This would prove a serious disadvantage against the use of the *Taccada* pith, in forming sheets of sufficient size. It is possible, that difference of soil and mode of growth under cultivation, might increase the diameter of the pith. The Formosa plant is stated to grow in swampy ground, whereas the *Taccada* grows along the sea shore, throughout the Malay Archipelago.

The *Scævola Taccada,* or its pith, are not mentioned, so far as I can find out, in "Crawfurd's History of the Malay Archipelago." But the plant and its applications were most carefully described before 1690 by Rumph. The following is an abridged translation of his account of the uses of the plant, extracted from the *Herbarium Amboynense,* where it is noticed in detail, and figured, under the name of Buglossum litoreum, or *Moral* of Amboyna.

After describing the medicinal properties, he says :—

"In the plump and juicy branches, such as are not thicker than the thumb, there occurs, enclosed in a thin layer of wood, a very white, dry, and pongy pith, very much resembling that of the *elder*, and, like it, susceptible of being sliced and fashioned in various ways. In the older branches the wood is harder, and the core of pith is much smaller, while in the trunk there is so little that it is hardly conspicuous. In waste islands the trunk is some times seen of the thickness of the leg, leaning on the ground, and covered with a rough, cracked, soft, and fragile bark.

"In Chinese it is called "*Tscho,*" although it does not grow in China proper, but on the northern coast of Formosa near Kelang. But the Chinese kind shows much wood, and yields but very little pith.

"The white and spongy pith is much used" (in the Malay Archipelago) "for manufacturing artificial flowers, little figures and the like, which are stained of different colours, and employed as decorations at feasts and on festivals. The pith may be sliced up or carved into any form, and it takes colour readily. Thin slices, suitably arranged, are glued together by means of starch, and with such elegance and skill, that at a little distance they look like natural roses. The red and pink tints are produced by a decoction of sappan wood, the blues by Indigo, the yellow by turmeric, and the green by Dracœna leaves."—(Rumph. Herb. Amboyn. tom. iv, p. 117, tab. 54.)

The points most worthy of notice, in this account, are that Rumph describes the *Taccada* or *Tcho*, (*Ambong*, and *Chow* in Chinese, of Mr. Lewis) as growing on the northern coast of Formosa, being the very quarter, whence *Rice-Paper* pith is said to be derived: while at the same time, he states the Formosa or Chinese kind to be inferior in the "yield" of pith, as compared with the Malay or Amboyna plant.

The vegetation of Formosa is but very little known, and it is not improbable that it may produce two pith-yielding plants, the one being the *Taccada* as stated by Rumph along the sea shore, and the other the *Rice-Paper Araliaceous* plant in swampy grounds more inland, as averred by modern authorities.

I have verified Rumph's description of the pith being most abundant in the young shoots, and of its being very slender in old and thick wood, upon growing plants in the Botanic Garden.

Although the evidence does not bear out Mr. Lewis's conjecture, that the *Taccada* is the source of true *Rice-paper* pith, yet it cannot, at present, be confidently said that it is not. The point is still open for further observation and research. Mr. Lewis's view is founded on fair and plausible grounds: and he has awakened attention to a material which has been long overlooked. *Rice-Paper* was successfully applied to the manufacture of artificial flowers in Europe, and the *Ambong* pith of the Archipelago is largely employed for the same purpose, in its native country. Any inquiry, hereafter, upon the *Rice-Paper* plant of Formosa will be incomplete, if it does not clear up the points raised by Mr. Lewis's conjecture, regarding the *Scævola Taccada.* From the lively interest taken in the enquiry at present, there is little doubt, but that every uncertainty regarding *Rice-Paper*, and the plant yielding it, will be disposed of satisfactorily, within a year or two.

H. C. BOT. GARDEN: *July*, 1852.

Report on Fibrous Specimens manufactured from the Mŭddār, (Calatropis Hamiltonii ?) and received from CAPT. G. E. HOLLINGS, *Deputy-Commissioner of the District of Leia, in the Punjab.*

I have sent to your address a small parcel containing specimens of the bark, fibre, thread, string, and rope, made from the Mŭddār plant, *Asclepias gigantec* * which grows in great abundance, and without any cultivation, in all the sandy desert soils in India. It appears to me that the material for ropes is excellent; should it prove so, it must be of great commercial importance. I have been told that a cloth has been made with one-half of the threads from the Mŭddār, and the other of silk, which is very lasting, and of an excellent texture. I have been promised a specimen of this cloth, and if I get it, I will send it to you. I presented some specimens of twine to the Punjab Horticultural Society, and was asked to write an account of the manner in which it was made. I had not at the time personally superintended the manufacture as I have since done, and was in one respect misled, unless there are different methods of making the thread. The specimens I send to you were made in the following manner. The sticks of the Mŭddār were cut about 12 or 18 inches in length, the outer bark was then carefully peeled off, and the cotton picked from the inner part of it, or that part which was nearest the wood of the shrub. After the cotton was picked, several threads were placed side by side, and twisted into an united twine by rubbing them between the hands, in the same way as the tailors make the cotton thread when they require it for sewing. No water is used; every thing is done by manipulation. I first heard of the twine made from the Mŭddār being used for fishing nets from General Cortlandt at Dehrah Ghazee Khan. I found a person who had it made, and got him to teach some of the prisoners in the jail, by whom these specimens were made.

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* The plant used by Captain Hollings was most probably not the true "Mŭddār," *Calotropis gigantea* of Bengal, but the "ak," *C. Hamiltonii*, which is the prevailing species in the arid parts of Hindustan, and a smaller form.—EDS.

From what I have heard on the subject, I am induced to believe that a good cheap material for cordage is much required. It is said that the Mŭddār thread gets stronger from being wet, and wears very well. Should it, on trial, be found to answer generally, a great improvement would immediately be made in its preparation, and a superior kind of canvass might be made from it. Some chemical preparation may be found by which the separation of the fibre, or rather the cotton from the fibre, might be effected, so as to ensure an uniform thickness of thread. A connected series of experiments would enable us to judge what is the proper season for extracting the cotton; and also, if by cultivation, the staple could be improved and a constant supply obtained. The object to be kept in view must be whether it affords a good substitute for hemp. England would, I imagine, rather be dependant on her own colonies for the means of rigging her naval bulwarks than on any European country. I remember reading in the *Society's Journal* an account of the manufacture of some cloth from the cotton of the flower of the Mŭddār plant,* but I am not aware of any attempt having hitherto been made to introduce the manufacture of twine from the fibre. Should I be mistaken, and the subject has been fully discussed, I shall feel obliged by your presenting the specimens I have forwarded as having been made at Leia, and by your informing me how they are esteemed. I should also like to know what price the twine would command in England, and in what shape the material ought to be exported, that is, as jute or as twine. Rope could of course be better made in England, with the assistance of machinery.

Specimens of the wood, bark, fibre, cotton, thread, twine, cord, and rope, made from the Mŭddār plant, *Asclepias gigantea*, prepared at Leia in the Punjab, and presented to the Agricultural and Horticultural Society by Capt. G. E. Hollings:—

No. 1. Pieces of wood of the Mŭddār.
No. 2. Ditto bark ditto.
No. 3. Ditto fibre ditto.
No. 4. Cotton.
No. 5. Thread made by a cotton wheel
No. 6. Ditto by the hand.
No. 7. Balls of twine.
No. 8. Skeins of cord.
No. 9. Bits of rope, with different numbers of strands.

Minute by Capt. A. Thompson.—The fibre of the Mŭddār plant is in my opinion better adapted for cloth than cordage. The specimens of fibre sent are cut so short that they cannot be properly dressed and spun into rope yarns, although it appears evident that, if cautiously removed from the stalk, it might be produced long enough for any purpose.

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* A paper on this subject, communicated by E. H. C. Monckton, Esq., C. S., entitled, "On the manufacture of cloth and paper from the downy substance contained in the follicle of the Mŭddār," is published in Vol. VII.—Eds.

It possesses more of the nature of flax than most of the fibrous substances I have seen in India. And as Captain Hollings states that it amalgamates readily with silk, which is indeed evident from its nature, I should think it an article of considerable value in England. I feel diffident in naming a price, but were the fibre preserved well cleaned, and in lengths of about 3 feet, and so free from Bark and other impurities, that it would easily go through the hackles, I have no doubt it would fetch £30 to £40 per Ton in England, perhaps more.

I may remark that the small cord attached to specimen No. (8 ?) sustained, without showing symptoms of distress, three cwt., a test quite equal to the best cordage that is made.

Minute by Mr. Joseph Willis.—I have perused the letter of Captain G. E. Hollings, dated Leia, April 10, 1852, addressed to the Secretary of the Agricultural and Horticultural Society, mainly on the subject of the fibre derived from the plant *Asclepias gigantea,* with exceedingly great interest.

I think that the fibre possesses very extraordinary merit, and will be very highly valued by the spinners and manufacturers of Great Britain and Ireland, for use in all their various fabrics, and especially those of the finer and finest descriptions.

It is impossible or very difficult to state the value per cwt. or per lb., which it would bring in the British markets, because that must depend on the various conditions in which it might be offered for sale; but my impression is, that if well prepared, it would command a very high price;—and if even only prepared in a rough and rude manner, that it would sell also to great advantage. This opinion being founded on the presumption, that the quantity yielded from a given quantity of land, if in due cultivation, would, on the average, be equivalent to the produce of articles usually cultivated which could be comparatively estimated.

The raw fibre—as classed ticket No. 4—is what I now more especially advert to; in some such state of preparation *as this;* but to be rendered as *clean,* FLEXIBLE, *bright, and lustrous,* as possible; with as much length, as the natural ramification of the plants will give, with a quick but convenient manipulation of the operator, I think the commodity will be found most acceptable to the spinner and manufacturer.

I cannot close my minute without expressing the following opinion and view of the subject; viz.; that if we shall have found in this article a new mercantile commodity of considerable value, and whose growth is congenial with the arid climates and the desert soils of the Punjab, we shall (on the further information obtained as to its degree of productiveness under culture, which it would be desirable first to procure) then be able to go up to Government with a recommendation to give countenance in every way which lies within its power to its extended cultivation.

When we consider the peculiar character of the countries in which this plant is said *naturally to abound with delight,* and more especially THAT *of the people who are the immediate or proximate inhabitants,* we cannot be otherwise than struck with the important and beneficial change which might ere long ensue in those portions of the British Indian dominion, wherein such change is *now* so much needed; if we shall have hit upon a matter so well calculated to encourage and reward their mercantile enterprize, as we may justly hope that this will prove to be from what is now laid before us.

Minute by Mr. G. T. F. Speede.—I recognize in this Mŭddār an old acquaintance,—one of the most troublesome jungles Indigo Planters meet with down here; the juice of the leaves being used by natives as a cure for itch, and ringworm, as also for intestine worms; the inspissated juice being used as a purgative. I must confess, however, that I never saw the fibre used before, although one of the strongest that could be met with; and the use of it, no doubt, might be very extensive, especially as it is of a nature likely to prove very durable, but the sticks should not be cut short, length of fibre being a great object. For my own part, I think it most desirable that attention should be paid to it, and I have no doubt our Planter friends will not be very sorry to convert so great an enemy to amicableness.

I have just shewn the specimen of Mŭddār produce to a nautical, who has had some experience in building and rigging vessels, who pronounces No. 9 admirable for deep sea line, and No. 8 for seizings, both of great strength.

Report by MR. WILLIAM HAWORTH *on Thibetan Sheep's Wool forwarded by* DR. CAMPBELL, *Superintendent of Darjeeling.*

I have the pleasure to forward two samples of wool from Thibet, Nos. 1 and 2, and shall be much obliged if you will procure for me from some one of the Society's Committees an estimate of the probable market value of the article in Calcutta.

I desire this information for the Thibetan traders who annually visit Darjeeling, and who will not risk bringing wools so far, without some knowledge of the price it would fetch in Calcutta.

DARJEELING: A. CAMPBELL, M.D.,
April 15*th*, 1852. *Member Agr. Soc.*

In reply to your note of the 12th instant, accompanying two samples of Thibetan sheep's wool sent by Dr. Campbell of Darjeeling for the Society's report, I consider both samples to be taken from one fleece. No. 1 is worth about 4*d.* per lb. more than No. 2 in the English markets, and in comparison with samples lately received from home, I value No. 1 at 14*d.* to 16*d.*, and No. 2 at 10*d.* to 12*d.* per lb. there.

It is a description of wool that would be much liked by the manufacturers at home. It is very clean and soft, and for its length it is fine in texture. I consider it is well worth Rs. 25 (Twenty-five) per Bazar maund at Calcutta, and at that rate a large business could be done in the article, if the bulk proved equal to the quality of the samples now before me.

But to form any thing like a correct notion of the value of the produce of wool from Thibetan sheep, it would be necessary to have a few of the unbroken fleece in the condition in which they are taken from the animal, as I think it would be found, that there is both much finer as well as coarser wool on one fleece than the samples sent by Dr. Campbell, and it would be desirable that the unbroken fleece was brought to market than to attempt to separate the various qualities by people ignorant of the wants of the home manufacturers. I ought also to state that I found a small portion of the sample No. 2, long enough in staple to "*comb*" which would enhance its value at home.

WM. HAWORTH.

CALCUTTA : 21*st May,* 1852.

A few hints for the treatment of Pot-Herbs. By MR. JOHN McMURRAY, *Head Gardener of the Society.*

Having this season been favored with a fair opportunity for cultivating the Scotch Pot-herbs in India, the following particulars of their management, from the time the seeds were received up to the present, may not be uninteresting :—

On the 9th November last, twelve kinds of Scotch pot-herb-seeds were received in this garden and sown on the following day (10th November, 1851), in gumlahs filled with a compost composed of equal parts of peat and leaf mould, with the addition of a little well-washed sand. In fourteen days after sowing, ten out of the twelve kinds of seeds had germinated freely. These seedlings were pricked out into other gumlahs as soon as they had formed the second rough leaf, where they remained until the 3rd of March; by this time the plants had made a healthy and vigorous growth. On the date last mentioned, I had an open plot of ground trenched 2½ feet deep. After trenching, the ground was levelled, and beds marked off twelve feet broad, with an alley of two feet between each bed. The soil in the alleys was dug out fifteen inches deep, and placed equally on the centre of each bed, for the purpose of forming a small ridge when levelled, to prevent too much water from laying on the surface, which otherwise might take place and more or less injure the roots of the plants. At the time the beds were thus formed, I had a large quantity of decomposed vegetable mould in store, which was spread four inches thick over the whole surface. Observing at the same time to retain the ridge above referred to, the decomposed compost was slightly pointed into the surface with a spade, and the beds finally levelled for the plants. They were then carefully lifted out of the gumlahs with good balls, and containing almost every rootlet, and immediately planted and afterwards drenched with water. The plants rooted and grew vigorously in this compost, and in the latter end of March some of them commenced flowering, as will be seen mentioned in the remarks below. Their after treatment was guided by the state of the weather, the soil being frequently hoed to destroy all weeds, and keep the surface open for the admission of air and water: the latter being freely given through the rose of a watering can in the evening; but when the weather appeared likely to rain, the water from the can was withdrawn, and immediately after a shower, the soil on the surface was hoed to prevent the ground from caking.

Remarks.

1. The Hyssop flowered in April, and matured perfect seeds in May, and is maturing good seeds up to the present time.

2. The Summer Savory flowered in March, and ripened all its seeds in the beginning of May.

3. The Anise flowered in April, and ripened all its seeds in the latter end of May.

4. The sweet Basil flowered in March, and produced ripe seeds in the month of April, and is maturing its seeds up to the present time.

5. The Thyme flowered in the month of May, but has yielded no seeds up to the present time.

6. The Sweet Marjorum flowered in April, ditto ditto.
7. The Sweet Fennel ditto, ditto ditto.
8. The Sage plants are in a healthy state—no flower.
9. The Rosemary, ditto.
10. The Lavender, ditto.
11—12. The Angelica and Cumin seeds did not come up.

12th June, 1852.

Report on New Granada Paddy raised in the vicinity of Darjeeling, and forwarded by Dr. Campbell, *Supt. of Darjeeling.*

In February, 1851, Messrs. Gillanders, Arbuthnot and Co., merchants of this city, forwarded to the Society, a small quantity (36℔s.) of New Granada paddy, which had been sent to their friend, Mr. Peter Serjeantson, of Liverpool, by his brother-in-law Mr. Jordan, of New Granada, accompanied by the following remarks:—

"*Arros de Loma, or Hill Rice.*—This rice is, I believe, peculiar to the province of Manquita in New Granada, and is cultivated in the following manner, in dry, sandy, or gravelly hills (never in marshy countries, or where irrigation is used,) and in climates varying from 70 @ 85 degrees of Farenheit's thermometer.

"It is sown in the middle of March or middle of August in shallow holes made with a stick, not more than two to three inches deep, four or five grains in each hole, which are about 14 inches apart, the ground being merely cleared of the weeds by burning, or the hoe.

"The first crop is ripe in three months after sowing; when cut down it springs again, and yields a second crop in a month or six weeks after the first, and even a third has been obtained. The two last are however not so abundant as the first, though still a great desideratum. It should be cleaned with the hoe when weeds spring up, and when cut green is an excellent fodder for cattle or horses. The grain is rather smaller than that of the "Arros de Cienega" or marsh rice, but whiter and more esteemed. It can be kept without spoiling for an almost indefinite period. I shall feel much obliged by this small parcel being forwarded through some intelligent person to the East Indies, for the purpose of being sown in a favorable situation, being convinced, that from its peculiar qualities, especially in not requiring irrigation, it may prove an inestimable blessing in that country."

The seed in question having been previously tried in the Society's garden, and found to germinate very readily, was transmitted, in small packets, to twenty-five localities in various parts of the country. Mr. T. M. Robinson, of Chota Nagpore, to whom a small quantity was sent, wrote as follows:—"Immediately the paddy reached me I planted out about one-fourth of it in the manner described in the printed enclosure of your letter, and will let you know the result. The soil of this country is exactly adapted to the plant, but I fear the temperature of this season will not suit it, the thermometer ranging from 80° to 100°, in the shade; and also the rains will have set in before the plant is full grown. The cold season I think would suit it better, provided it would not be injured by the low temperature of the nights here 32° to 38.° I am shortly going to visit an elevated table-land in this country, called the Mayan Paat, 4,500 feet above the sea, and there, I think, it may answer, and prove of great value, as in the hottest weather the temperature will not exceed that described as suiting the plant. The same difficulty, however, about the rains may apply there, if the seed is sown now; and I think it ought to be put into the ground early in March." And he added, in a subsequent communication, dated 14th July, "None of the paddy seed germinated in Sirgooja, but I did not try it on the Myan Paat, having been obliged to return home without visiting that place. I am inclined to think that it would not do even in this country, as the dry season would prove too hot for the plant; the only chance for it would be, if it would stand the cold, in which case it might be of some value."

Capt. G. E. Hollings, writing from Leia in the Punjab, under date 11th November, 1851, announced that the seed did not germinate—"They reached me late in the season, and the ground on which they were sown was completely flooded by the inundation, which probably destroyed the seeds."

Mr. D. F. McLeod, Commissioner and Superintendent Trans-Sutledge States, communicated by a letter to his address from Mr. E. C. Bayley, Deputy Commissioner of the Kangra district, dated 30th January, 1852, that the experiments made in six different parts of that district, had entirely failed; "in one place only, somewhat moister and more sheltered than the rest, a few plants came up, but these did not yield any seed."

Mr. Merrick Shawe, Collector of Sylhet, stated in a letter under date the 17th April, 1851,—"The seed of New Granada rice duly reached me. I regret I did not receive it a month or six weeks earlier; half the quantity was sown immediately on its receipt, but I am sorry to say to no purpose, as the rain fell in torrents, and we have had wet weather here ever since."

Mr. M. P. Edgeworth, Commissioner of Mooltan, announced in a letter, dated 24th August, that the portion of seed received by him, had not germinated.

The only other member from whom the Society has heard on the subject, is Dr. Campbell, Superintendent of Darjeeling, whose letter, of a more satisfactory nature, together with the report of the Grain Committee on the sample of paddy therein referred to, are now published. Should any further information be obtained hereafter on trials made with this grain in other parts of the country, it will be given in a subsequent number of the JOURNAL:—

"In April, 1851, the Society sent me some New Granada rice for trial in the Hills near Darjeeling. The object in doing so was to give an opportunity of naturalising a variety of rice remarkable for two peculiarities.

"1st. That it did not require irrigation; and—

"2nd. That it would yield two or three crops—by cutting—from the same sowing. Soon after receiving the seed I informed the Society that upland rice, which did not require irrigation, was no novelty in this part of the Himalaya, as all the varieties of rice which are grown on the mountain sides yield abundant returns without irrigation. As regards the second distinguishing peculiarity I have found it quite a fallacy. The paddy required just as long a time to grow and ripen, as any other variety here, so that there was no time for it to give a second crop during one season, nor did it by any means grow with unusual luxuriance.

"I have the pleasure to forward a portion of the produce for the inspection of the Society. It is very good upland paddy, but nothing extraordinary. I should like very much to know the particulars of the described peculiarity, and whether there is not some mistake in the matter? Does the paddy really yield 2 or 3 crops of ripe grain in one season from one sowing, or does it only admit of 2 or 3 cuttings when green before the ear shoots, and then ripen its seed?

"The sample I now send was grown at an elevation of 3,500 feet.

DARJEELING: 15*th April*, 1852."

MINUTE BY MR. JOS. WILLIS.—On comparing the Dargeeling hill paddy grown from the New Grenada hill paddy, "Arros de Loma" or hill rice, with the original seed whence it is immediately descended, I think I find it somewhat inferior:—

It is about $2\frac{1}{7}$ per cent. lighter in weight.

Its husk is not quite so fine and regular.

Its colour is less uniform and, to my eye, is less inviting in its hue.

Thus, although these circumstances tend in a trifling degree towards its comparative depreciation, its main merit must be determined by its quantum in yielding both grain and straw when compared with that of the hill grown plant already naturalized at Darjeeling.

On this head we are without information, save that it did not exhibit any extraordinary degree of luxuriance.

It would seem that in the Darjeeling locality of about 3,500 feet it has not the property of yielding a *grain* crop more than once in the season, whatever may be its property and power in this respect in its more natural site in New Granada.

Dr. Campbell seems to think there may be some mistake in this matter, and of its power to give two or three crops of *ripe grain* in one season, and although the word "*grain*" is not stated, the terms of "*ripe crop*" are given, and the obvious inference is, that two and three ripe *grain* crops are had.

This is certainly a remarkable property and is perhaps referable to the peculiar congeniality of the locality in New Granada of soil, climate, &c.

In addressing Dr. Campbell further on the subject, it may be well to give him an *extract of the Report,** as given from the New Granada letter.

8th June, 1852.

MINUTE BY MR. W. HAWORTH.—I have carefully examined the original New Granada paddy, and which appears to me, to be in every respect a very superior kind of grain, little, if any, inferior to the best Carolina. The produce of this seed said to have been grown at Darjeeling, is inferior to the original seed both in color and size of grain; this paddy has not a healthy appearance, which caused me to think it had been cut before it was sufficiently ripe, to test which, I had a small quantity of both the original seed and that grown at Darjeeling *husked,* and a portion of these again cleaned of their inner pellicle, to prepare them for the market; the result is shewn by the accompanying small samples:—

No. 1 is New Granada paddy; the outer husk only removed.

No. 2 is rice from the same, cleaned fit for the market; both of these samples shew a well grown ripe grain in first-rate condition.

No. 3 is paddy from New Granada seed, grown at Darjeeling, the outer husk only removed; it appears to be in very green condition, as if reaped before it was sufficiently ripe.

No. 4 is rice from New Granada seed grown at Darjeeling, cleaned for the market; as the grain is unripe it would propably not carry well on a long voyage.

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* This extract was given when the seed was furnished to Dr. Campbell.—EDS.

From Dr. Campbell's account it does not appear to have succeeded well in the locality of Darjeeling, nor to have exhibited any of its peculiar and valuable properties said to belong to it, in its natural clime. It would be interesting to have the result of the trials made with the seed in other quarters where it was sent for experiment. I have two small patches now growing from the Darjeeling seed—it has been in the ground about a month, and so far it looks well—but I do not anticipate its being ready to reap before the common paddy of this neighbourhood.

The weight of the original New Granada paddy is 48 ℔ 6 oz. to the imperial bushel—being the mean of 5 weighings.

The paddy grown at Darjeeling weighs 46 ℔ 14 oz. to the imperial bushel—mean of 5 weighings.

CALCUTTA: *9th June*, 1852.

MINUTE BY BABOO RAM GOPAL GHOSE.—A sight of the two samples of paddy shows at once the inferiority of that grown at Darjeeling. A great many grains in this sample are not *full*, which justifies, I think, Mr. Haworth's inference that the paddy was cut before it was quite ripe. The unhusked grains prepared by Mr. Haworth, confirm this belief, but his No. 2 and 4—that is the cleaned rice,—do not in my opinion show so marked a difference. On the whole I should consider the market value of the Darjeeling produce to be about 10 per cent below that of the original Granada seed.

CALCUTTA: *10th June*, 1852.

MINUTE BY MR. W. STORM.—There is evidently a difference in the two grains—Darjeeling is not suited for the Granada grain, nor is it likely that any other place in this country will answer for its growth.

CALCUTTA: *14th June*, 1852.

MINUTE BY MR. G. T. F. SPEEDE.—I agree in all that Mr. Haworth has stated; the quality of the paddy has decidedly, conspicuously degenerated, but I am disposed to think that it has done so rather from this grain having been reaped before being sufficiently ripened than from any natural cause; there is no doubt that the lower range of the Darjeeling hills is a most suitable locality for the growth of this rice.

On the Nettle Grasses of Assam, and their valuable fibrous properties; communicated by Major S. F. HANNAY, *Comdt. Assam Local Infantry Battalion, in a letter to the Secretary to the Board of Revenue, Fort William.*

SIR,—I have the honor to acquaint you that by a boat which left this station for Calcutta, I have sent to your address, through my Agents, Messrs A. Gouger and Co., 4 small parcels of Nettle grass fibre, which are duly marked and numbered, to shew the different plants to which they belong, and to state that my object in doing so is to bring to the notice of the Board of Revenue and Government the fact, that we have in Upper Assam particularly, the China nettle grass, and other allied species, which would be found in my opinion equally valuable as flaxes of the finer qualities, of which there is great scarcity in the European market, according to the report in the "Hand Book of the Exhibition."

2. For the last two or three years I have paid some attention to the cultivation of the *Urtica nivea.* The climate and soil of Upper Assam, being most favorable to the productiveness of this plant,—four crops being procurable from the same roots during the season, from February till October—the average produce of one Assam poorah [1¼ acre] well manured, and with a full crop of stems or reeds, being from 10 to 12 maunds, and the expense of cultivation and manipulation (suppose 100 Poorahs were under cultivation) amounting to about 10 Rs. per maund, at which rate, and sometimes less,

it can be purchased in small quantities from the Dooms or fishermen of Upper Assam. I have ascertained also through Mr. Sangster, of No. 75, Cheapside, London, that the first samples which I sent to him in 1850, shewed a better state of cultivation and preparation of the fibre, compared with what is imported from China, where I am led to believe the first quality of China grass or *Urtica nivea* is shipped at 27 Rs. the bazar maund: samples which were forwarded to Leeds also, were valued at £50 per ton, so that we have in the *Urtica nivea*, or China grass of Assam, a valuable article of export, and considering the quantity of waste land in Upper Assam favorable to the growth of the plant, its cultivation on a large scale might be carried out with favorable results, or at all events it might be advisable to encourage the cultivation of this nettle amongst those who already understand it, and in time it would likely find a ready market at a lower rate, than it can be procured at present.

3. With regard to the other three samples which have been sent as allied species to the *Urtica nivea*, they are all of jungle growth; they are also known and their fibres used by the Chinese, and with the *Urtica crenulata*, *Urtica Doominci* and a *Bœmeria* called Bon or Jungle Rheea, or nettle grass, used by the neighbouring Hill tribes of Upper Assam, in the manufacture of articles of clothing, nets, ropes, &c. The Mesakhee is very abundant, and the Murees and others might be induced to bring the fibre for sale; but as the value of this nettle in the market has not been ascertained, I have only offered at the rate of 5 Rs. per maund, which, however, on account of the slow method of manipulation, has not been considered remunerative; but as all those mentioned as of jungle growth are cultivatible, the *Urtica Mesakhee* and the *Bœmeria* would probably be found of equal value with the *Urtica nivea*: in the meantime, however, it would be desirable to know the value of the Mesakhee as a flax, and I have therefore requested Messrs. Gouger and Co. to ascertain this by forwarding 3 maunds of the fibre to

the Home market. I have also sent a parcel of 5 seers to the Agricultural and Horticultural Society, to be tested as to its capability for log lines and twine, for which purpose it appears to me well adapted, and indeed most of the nettle fibre from their capability of standing wet.*

In conclusion, I beg leave to state that I shall feel great pleasure in giving every information or assistance in my power, towards bringing to the notice of dealers the valuable fibre products of Upper Assam, in which, besides the nettles, there are many valuable fibre-producing plants of the "Malvœ" species, of which the *Abroma Augusta* and *Sida Rhomboidea* are marked as having fibre superior to any "Jute" exported from India.

DIBROOGHUR: *the* 21*st April*, 1852.

⁂ Just as the foregoing paper was passing through the press, a letter was received from Dr. Macgowan, the Society's correspondent at Ningpo. The following extract from it is appended in this place in reference to the price at which Major Hannay states the Rheea of Assam can be obtained. It should be mentioned that, although Dr. Macgowan's letter is dated and posted from Hong-Kong in November, 1851, it did not, through some mistake, reach the Society before the end of August, 1852:—"I took immediate steps on receipt of your letter to ascertain the market price of the grass-cloth fibre at Canton and Shanghai, but until this afternoon I could procure no reliable information, in consequence of the fact that the article is no longer exported to Europe, the price being found altogether too high for English manufacturers. I cannot better illustrate this than by stating that a mercantile house in London sent an order to China for a quantity of the fibre, provided it could be purchased at six dollars per picul, *i. e.* 133 lbs. The price of the article did not allow the agent to execute the commission, and soon afterwards he was informed by his English correspondent, that even at that price it could not be sold in London. Unless, then, it can be produced in Assam at a price considerably lower than that which is here given, it would not find a market."

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* *Extract of a Report by Capt.* A. THOMPSON, *(a Member of the Society's Hemp and Flax Committee) to the Secretary Agricultural and Horticultural Society; dated* CALCUTTA, 26th July, 1852.—"Agreeable to your request, I forward you a log-line made of the fibre of the red mesakhee plant, as also the remainder of the fibre itself. I find the strength of it quite equal to Russian hemp, but for want of being properly harvested, the fibres cling so close together that great loss of material takes place in hackling it. I think it well adapted for cordage, and if brought into general use ought to bring as much as Petersburgh hemp."

A brief account of the experiments that have been made with a view to the introduction of the Tea Plant at Darjeeling. By J. A. CROMMELIN, *late Major, Bengal Engineers.*

Having recently perused Mr. Fortune's Report upon the Tea Plantations in the N. W. Provinces, I am led to infer from his statements, as well as from my own observation, that the culture of the tea plant at Darjeeling, on an extensive scale, would be attended with complete success, and afford good return upon capital, to any association that might start under the auspices and favor of the Government.

In corroboration of this opinion, I will give a brief account of what has already been done here in the way of experiment, on the authority of papers in the 6th volume, part 2, of the A. AND H. SOCIETY'S JOURNAL, and add a few facts regarding the result and present state of the experiment.

In November 1841, Dr. Campbell, the Superintendent, desirous of ascertaining the suitability of the soil and climate of Darjeeling for the cultivation of the tea plant, obtained from Dr. Wallich and sowed a few seeds grown in Kumaon, of China stock; the result was about a dozen healthy seedlings. These were examined and reported upon by Mr. A. Macfarlane, of Assam, about five years afterwards, who declared the plants to be in a very healthy condition, and that in the hand of a cultivator, they would then have been yielding a fair produce of tea. A small sample of the manufactured tea he pronounced to be of a very good flavor, but from the defective mode of its manufacture in the want of the requisite implements, no satisfactory judgment could be formed.

Encouraged by this favorable result, Dr. Campbell determined to try the cultivation of the plant on a more extended scale, and having procured seeds from Assam, both of the indigenous and China stock, he obtained thence upwards of 7,000 seedlings, which in his letter to the Agricultural Society dated 13th August, 1847, he reported to be in a thriving condition. In the spring following, however, during Dr. C.'s absence and some unusually dry weather, the whole plantation, except a very few still alive, died off. This circumstance, which was also duly reported at the time to the Society, discouraged Dr. Campbell from further attempts, and led him to infer that the climate and soil up here were not congenial to the plant.

At the same time that Dr. C. sowed this Assam seed in November, 1846, he gave me a small package of the seed, which I sowed upon the Leebong Spur at an elevation of about 6,000 feet. From these I raised 400 or 500 seedlings. Mr. J. Grant, C. S., also sowed a few seeds near the same locality and obtained many healthy plants. Of mine, some died from neglect, but a sufficient number have grown up, strong, luxuriant, and bushy, without irrigation or pruning, to the height of 3, 6, and even 8 feet, to prove to myself, and to others better qualified to judge, that no reasonable doubt can now be entertained of the successful introduction of the tea plant at this station. They were watered occasionally for the first year or so when very young and during the hot weather, but no systematic irrigation was called for or has been employed. The greater portion of these plants seems to be of the *Thea viridis,* as drawn and described in the 6th vol. of the SOCIETY'S JOURNAL, above-mentioned.

Subsequently, I obtained from Dr. Jameson, through Mr. J. W. Grant, retired C. S., a small parcel of Kumaon seeds, China stock, which germinated most favorably at Leebong, and after deducting some given away, I have now about 50 or 60 plants in their fifth year from 3 to 5 feet high, in full leaf bearing, many of them covered with seed capsules in progress of ripening. This plant agrees with the *Thea Bohea* No. 3, figured and described in the 6th volume alluded to.

The dozen seedlings first raised by Dr. Campbell seem also to belong to this species; they passed with the garden into the hands of Samuel Smith, Esq., who has succeeded, as Dr. Withecombe tells me, in rearing from their seeds about 500 seedlings, at an elevation of 7,000 feet.

It cannot therefore be doubted that plants from which fruitful seeds have been annually obtained for several years, are growing in a climate and soil perfectly congenial to their habits, and favorable to their propagation. It is true that at Darjeeling itself there may not be enough of sunshine, either for the purposes of successful manufacture, or to call forth the greatest leaf-producing energies of the plant; but in the whole tract between this and Punkabarry, any requisite degree of elevation, heat, and suitability of climate might be found.

Dr. Withecombe, our Civil Assistant Surgeon, a zealous and successful Horticulturist, has about 50 healthy plants just appearing above ground, at an elevation of about 5,000 feet, from seeds ripened in Mr. Smith's garden. Dr. W. roughly dried and prepared a few of the leaves from this garden. I tasted a brew from them, and fully concur with him in his conviction that, with the proper implements and manipulation, the tea will prove of excellent quality, in justification of an opinion long since pronounced by Dr. Jameson "that the plant grown at Darjeeling will yield tea of a superior description."

It is now pretty well known that the tea plant will thrive almost in any soil, avoiding *excessive* moisture; and through the kindness of a friend at Nainee Tal in furnishing me with a table of the annual temperature, and of the rain that falls there, I find that a great similarity exists in the climates of Darjeeling, and of the Tea Hills in Kumaon, the only difference being in the greater quantity of rain which falls here, to the amount of about 50 inches annually, the averages being as 80 inches to 130 inches.

To try the plant at a lower elevation, I gave 80 seedling plants, about 3 years ago, to Mr. Wm. Martin of this station, who transplanted them on some land, nearly flat, between Punkabary and Kursiong, at an elevation of about 2,500 feet. A few, 8 or 10, died in transporting them some 25 miles, at a time when the weather was dry; and the remainder were daily watered until the rains, since which neither watering nor irrigation has been employed, and they are now, as Mr. Martin tells me, in a luxuriant condition. The aspect is south east with a rich light black soil. On the same land Mr. Martin has planted 23 coffee trees obtained from the Botanic Garden; these have grown surprisingly, and are in fine condition. This year the whole of them have blossomed and fruited, but by a late severe squall the berries have been nearly all blown off. He has also raised about 50 young coffee plants from seed, and feels confident that both tea and coffee will thrive in these hills at that elevation, 2,500 feet.

Tea lands, not adapted for other purposes, may be obtained in the Darjeeling tract, to almost any extent, with favorable aspects and soils, and at any elevation from 1,000 to 6,000 feet. The situation of the tract with reference to facility of carriage, and to proximity to the port of exportation, leaves nothing to be desired; and when the Rail to Rajmahl is completed, 4 or 5 days will suffice to land the produce in Calcutta.

I am not a Horticulturist, but I think I have adduced facts which should lead to some further inquiry upon the subject of this communication; for if the introduction of the tea plant here was at any time a desideratum, I suppose it is equally so now. My object will be fully gained if my statements shall be deemed of sufficient interest to attract the attention of persons capable of forming a correct judgment.

DARJEELING: *August* 13*th*, 1852.

Correspondence and Selections.

FURTHER REMARKS RESPECTING THE NATURALIZATION OF THE AMERICAN COTTON PLANT IN INDIA. BY DR. R. WIGHT, SUPERINTENDENT GOVERNMENT COTTON EXPERIMENTS, COIMBATORE.

To the Secretary to the Agri.-Horticultural Society, Calcutta.

1. SIR,—Since I had the honor of publishing my Circular under date 20th March, 1849,* circumstances have occurred, in connection with the experiment for the introduction and naturalization of the American Cotton Plant in India, which throw some additional light on the subject, and tend to impart greater confidence to the Ryot who has the courage to plant his field with the comparatively little known Exotic, in preference to the old-established Native plant.

2. During the first four or five years of the existence of the Farms in Coimbatore, experiments to ascertain the comparative advantages attending the cultivation of the two plants were annually made, and invariably ended in favor of the Exotic. But still, the Native lookers on would not be persuaded to believe our report, at least to the extent of satisfying themselves by a repetition of our trials; they would not in short see the matter in the same light that we did. The case is now altered, the objectors have at length made the experiment, and are becoming convinced by their own experience of the truth of what we have so long laboured in vain to satisfy them, viz., that the Exotic is a less precarious and more profitable crop than the Native cotton.

3. Within the last two years the Farms have ceased to operate practically, and the cultivation of American Cotton has passed into the hands of the Ryots. In the course of that brief period the quantity grown by them has augmented from about 10 to upwards

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* This will be found in *Journal*, vol. vii., p. 20.—EDS.

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of 100 Bales, and, doubtless, if they only find a steady demand for this article, they can and will indefinitely enlarge the amount. It is to be hoped therefore that the demand will continue and increase until the staple has acquired an understood market value, and become one of the established products of the country. This is all the encouragement, at least in Coimbatore, it now requires, and it is to be hoped it will not be withheld.

4. Last season (1850-51) was not a peculiarly favorable one for either kind, but those who cultivated both, found the American gave them acre for acre heavier and altogether more profitable returns. Thus encouraged, they repeated the experiment this one (1851-52), which has been one of the most unfavorable seasons for cotton growing experienced for several years, and with more marked success. Two nearly adjoining fields, similarly cultivated and sown at the same time with the Exotic and Native seed have respectively, from equal areas, produced 1250 lbs. and 500 lbs. of seed cotton—the one (exotic) worth in the present state of the market 50 Rupees, the other about 15 Rupees. The former is still in full vigour, and will in the course of two months give another, and I expect much larger crop, (there has been much rain of late), while the Native plant is quite done, and the land cleared for a new rotation. In this instance the Native cotton was sown on highly assessed black land, the American on red sandy soil. The preceding season both kinds were sown on black soil, and the proceeds were so far in favor of the American plant, that I am told 50 Rupees were received for the crop of a field which under Native cotton would not have realized 20. Under these circumstances, I trust I am not drawing too strong an inference in assuming that, had equal areas all over the district been annually cropped with these two kinds of cotton, the average out-turn, as regards both weight and value, would have greatly preponderated in favor of the Exotic: an inference supported alike by the many comparative trials on the Government Farms, and by the experience acquired, on a very large scale, in Dharwar, where the Exotic cotton is rapidly supplanting the indigenous, and, it is to be hoped, soon will altogether drive it out of cultivation, seeing that one use to which it is now applied is the adulteration, so far as that can be accomplished, of the American staple.

5. I pointed out in my former Circular that the supposed excessive heat of our climate, at first assigned as the principal cause of failure in this portion of India, had no existence: on the contrary, that the mean temperature of the Carnatic during the latter months of the year, our cotton cultivating season, was actually lower than that of the cotton growing provinces of America. This I illustrated by the following Table, which, to save the trouble of reference, I repeat here.

Table of Monthly Mean Temperature during the Cotton growing seasons, in Vera Cruz, Mississippi, and the Caranatic :—

	April	May	June	July	Augt.	Sept.	Octr.	Novr.	Decr.
Vera Cruz.	77.18	80.42	81.86	81.50	82.40	80.96	78 44	75.38	71.6
Mobile, ...	70.00	76.36	82 17	82.41	82.73	78.94	69 97	61.50	55 50
Natchez, ...	69.93	72.72	80 62	81.78	80.13	74.99	64 58	55.23	49.09
	Augt.	Septr.	Octr.	Novr.	Decr.	Jany.	Feby.	March	April.
Madras, ...	84.6	83.7	82.2	78.9	76.3	75.5	77. 7	80. 8	83.7

It was next asserted that the dryness of the climate was the cause of failure, and that therefore the American plant could not be successfully cultivated, except in those portions of India which partook of both monsoons. This I met by reference to trials made here, showing that, if sown during the prevalence of the S. W. monsoon, the crop was liable to be seriously injured by the rains of the N. E. one; but if, taking advantage of the occasional falls of rain in August and September, the sowing was completed in the course of these two months, that then the growing season was prolonged to the end of the N. E. monsoon, and the harvesting of the crop commenced in January, and usually continued until arrested by the rains of April and May, which we had generally observed produced a second crop in June and July. This I illustrated by the following Rain Table of Florida and Madras :—

	April	May	June	July	Augt.	Septr.	Octr.	Novr.	Decr.	Total
Florida	1.09	6.34	2.39	2.84	3.30	4.35	3.33	1 49	1.13	26.26
	Augt.	Septr	Octr.	Novr.	Decr.	Jany.	Feby.	March	April	
Madras	5.24	4.76	10.	12.42	3.25	1.33	0.23	0.36	0 63	38.22

6. These Tables prove that, in the Carnatic at least, neither excessive heat nor excessive drought can with justice be assigned as the causes of failure, if indeed we are entitled to make use of the

term with reference to the numerous experimental trials which have been instituted in different parts of the country.

7. The propriety of the term "failure" I am not prepared to admit, in so far as it originates in comparing dissimilar things. We have assumed that we have failed because our crops have generally fallen short of those realized in the most fertile tracts of America, possessing both a rich soil and genial climate. Had we, with greater justice, compared them with those obtained from the indigenous plant, growing in its native soil and climate, we should, I am convinced, have arrived at a different conclusion.

8. The season of 1851-52 was in this District a peculiar one. In the immediate neighbourhood of Coimbatore there was not a shower during the months of August, September, or October. In November there were a few days' rain during which both Native and American cottons were sown. The American Cotton has in one instance yielded at the rate of 2 to 1, and in another in the proportion of 5 to 2. In both, the crops were miserably small; in the case of the American under 60 lbs. per acre, and of the Native about 22, or to be more precise, two fields each of 22 acres yielded respectively 500 lbs. of Native, and 1250 lbs. of American seed cotton.

9. Another portion of the District, the South Western Talooks, was more fortunate, there they had rains in August, of which they took advantage to sow American cotton: subsequently they had a scanty N. E. monsoon in November, the same as at Coimbatore. The crops in that quarter were, in some of the more fertile lands, as high as 400 lbs. and 250 lbs. per acre will probably fairly represent the average. The out-turn in these Talooks of the Native cotton has not been so accurately ascertained, but is reported much below the average standard, because, as the growers said, they waited, according to custom, for the monsoon, which was a bad one, *i. e.*, fell greatly below the average. Had the usual rains fallen here in August or September, or had the monsoon extended over December, the indigenous crops would have reached the average weight, ranging according to the fertility of the soil from 150 to 250 lbs. per acre. The latter is always looked upon as a full crop of Native cotton; while from 350 to 500 lbs. is by no means unusual in the case of American in the richer sandy loams.

10. These two examples were entirely under native management—the only departure from their own habitual system of culture being the adoption, in the case of the exotic, of drills in place of broad cast sowing, and to this method they now seem to give the preference, on principle, as they are thereby enabled to plough and " cool" the land between the rows, thus placing it in better condition for the succeeding grain crop while it improves the cotton one.

11. If the weather is favourable for the operation, it may be repeated twice or even three times, and on the principle of increasing the fertility of the land, proves very beneficial to both the crop on the ground, and that which is to follow. Very few plants are injured by it, as the roots penetrate deeply, and are not in the way of the plough, while any plant trodden down by the bullocks, the roots being uninjured, soon recovers.

12. The first hoeing is a most important operation, and should never be delayed beyond the appearance of the third proper leaf, not counting the two seed leaves. Superfluous plants should at the same time be thinned out, so as to give those that are left ample room to spread and fill the ground. In a month or two, when the flowers begin to open, a second hoeing is wanted to clean the ground, otherwise it gets foul, and weeds choke the plants. This is the Native practice, so that they may be safely left to cultivate in their own way. In the course of this interval is the time for ploughing between the rows, but is not restricted to that period, for if the plants are not too large, I have often repeated it with evident benefit when the first of the crop was coming to maturity, or even when picking cotton.

13. From 3½ to 4 feet between the rows I consider a good medium distance, as it allows of the free use of the plough. I formerly thought they might be closer, but now I think, that even in indifferent soils, heavier crops are thus obtained than from closer sowing. This may perhaps appear paradoxical, but still I believe it is the case, as the fruit sets and ripens better, and fewer flowers blight and drop off unproductive:

14. On the subject of irrigation I have no further experience, and can add nothing to what I have already said on the subject, but my impression is, that it will be found to answer best in sandy

soil, that does not cake on the surface, after the absorption of the water.

15. Since the date of my last Circular, the Experiment for the naturalization of the American cotton plant has been extended to a new locality, namely, to the sandy soils along the Sea Coast, and, so far as the trials have yet gone, promise to succeed far beyond what I should, *à priori*, have anticipated.

16. This branch of the experiment originated with Mr. David Lees, of Manchester, at Trichendore, and is now being carried out there on a large scale by his relative Mr. Arthur Lees, and by two Messrs. Longshaws (brothers); and at Madras by Mr. Kenrick. Several other gentlemen at Tuticorin also tried it to a moderate extent, but have since, in a great measure relinquished it, owing to their success falling much below what Mr. D. Lees led them to anticipate.

17. Judging from what I saw, I feel disposed to think favorably of the locality—so favorably that I already begin to anticipate that these coast soils, bad as they seem, will yet be found, under good management, to hold about the same relative position to the American plant that the Black Cotton soils do to the Indian one. This, however, so far as Mr. D. Lees' operations extended, they can scarcely be said to have enjoyed, for, though as a cultivator he was full of zeal, he wanted experience, and being misled by appearances, his sanguine mind induced him greatly to over-estimate the probabilities of success: so much so, that in a letter of his read to the Commercial Association of Manchester, and published in their proceedings, he gives it as his deliberate opinion that these sandy soils will, when "rightly cultivated" produce "many times" 112 lbs. of clean cotton per acre. Perhaps he forgot at the time of writing that 112 lbs. of clean cotton is the equivalent of nearly 380 lbs. of seed cotton. I do not advert to this circumstance in either an unfriendly or invidious spirit, but simply to guard myself against the charge of having tacitly admitted the correctness of his views by passing over in silence, this most exaggerated estimate of the capabilities of these soils.

18. My own opinion is that his management was not skilful, but I go further and say, that if under the best management 300 lbs.

per acre, are on an average obtained from the fields I visited, it is a heavy crop; and that cotton on the lands in question will, in that case, prove the most remunerating Poonjay, or dry, crop grown in India; both because of the largeness of the crop, and the collateral advantages derived from easy and cheap cultivation, and unexpensive transit to the port of exportation.

19. These light sandy soils can be cultivated at all seasons and in nearly all states of the weather, whether wet or dry, they offer no impediment to either the hoe or plough. It is not so with those in the interior, which, a single week of warm dry weather often renders too hard to be worked by either. A small farming establishment therefore suffices for the one, while a large one, competent to do much work in a short time, is required for the other. I have never cultivated such land and may be mistaken, but my impression is, that I could cultivate as much coast land with 5 pairs of cattle, as I could, such as I have been accustomed to, with 15 or perhaps even 20 pairs, and do it better. This is a matter of much consideration, for, in the former case, the land can always be kept ready for the reception of seed, and a single shower, not enough to soften the surface here, would there moisten it sufficiently for sowing. Here heavy rains are required adequately to soften the ground for the plough, and often before the ploughing can, with every exertion, be completed, the land has become too dry for sowing, while the success or comparative failure of the crop may depend on the seed being got into the ground at that time. On the coast, half an inch of rain will often prove of greater service to the farmer than an inch and a half, or, perhaps, even two inches in the interior.

20. On the coast, the course to be followed in the cultivation of American cotton is the same as in the interior. The soil requires to be well ploughed, the deeper the better, and as much as possible freed from weeds, and if uneven, its inequalities reduced. The sowing should, when practicable, be completed between the middle of August and beginning of October, in which case the plant will be sufficiently advanced to derive the fullest advantage from the November rain.

21. In sowing, the seed may be either thinly dropped in light furrows about 2 inches deep, and covered in with a harrow, or a

hurdle drawn over the ground, or, if thought preferable, it may be sown in holes. In no case should the depth exceed two inches, but if it is simply covered, that is enough. If the soil is moderately humid and the seed good, it begins to shew itself about the fourth or fifth day, at which time the roots are from three to four inches long.

22. When the second or third proper leaf has appeared is the proper time for hoeing and thinning. This important operation should not be delayed, for otherwise the plant is apt to receive a check in its growth, from which it does not readily recover; and, unless the weather and soil are very favorable, may be permanently dwarfed and proportionably less prolific. Nearly all the recently sown fields, I saw, were suffering from want of early hoeing, a large proportion of the plants not having advanced beyond the hoeing stage, though others, sown at the same time, which had continued to grow, were already coming into flower.

23. Mr. Lees, in the letter above referred to, indicates two sowing seasons, namely, April and November. So far as my experience here, and the rain Table above enable me to offer an opinion, I cannot approve of either: April is too early, November too late. If sown in April, the plant is exposed to the risk of receiving a severe check from the land winds in June and July, and, if it survives them uninjured, it is in full harvest in September, October and November, the three most dark and rainy months of the year—bright clear weather being of all things most desirable for harvesting cotton. If again, it be sown in November it is too late, as the rains of the season usually end in the course of that month, and its proper growing season is shortened for want of rain. And then again the crop, when at its best, is exposed to wet weather in April and May, all of which risks are avoided by sowing, when the weather will permit, in August or September. But in this, as regards coast cultivation, in which I have had no experience, it may turn out I am in error. Experience is wanted on this point.

24. My attention was directed to the beneficial effect of shelter, as indicated by the greater luxuriance of the plants under the lee of hedges and enclosures. At Trichendore and Tuticorin during one portion of the year the wind is strong from the sea—South

Easterly: at another it is very strong from the land, and both are more or less injurious. I therefore took the liberty of suggesting that the fields should be intersected, at intervals of about 20 or 30 yards, with rows of the castor-oil plant, which I observed growing with great luxuriance, quite unaffected by the winds, and apparently not at all injurious to the cotton which was growing beside. I mention this, as similar protection may be required in other places, as well as at Trichendore, and as the oil plant bears freely, and the produce finds a ready sale, its introduction may serve a double purpose.

I have the honor to be,
Sir,
Your most obedient servant,
ROB. WIGHT,
Supt. Cotton Experiments.

COIMBATORE: 13*th May,* 1852.

On the Climate and Vegetation of the Temperate and Cold Regions of East Nepal and the Sikkim Himalaya Mountains. By J. D. HOOKER, M.D., F.R.S.—*(Reprinted from the* JOURNAL OF THE HORTICULTURAL SOCIETY OF LONDON, Vol. VII. Part 1, p. 69.)

[The following paper, upon a subject of some interest in this country, is so little likely to be seen by Indian readers that it has been deemed desirable to give it a place among our selections.]

The following notes were collected, and have here been thrown together, with the view of facilitating the cultivation of Himalaya plants, and of those of Sikkim and the adjacent mountains of Nepal in particular, by supplying accurate data obtained on the spot, relative to the various conditions of soil and exposure, the degrees of temperature and amount of humidity under which they flourish in their native country.

As the genus Rhododendron is the most prominent of these plants, and that about which inquiries are constantly directed to me, I shall commence with a description of it, prefacing this with some observations, which are called forth by a visit to several nurseries where many species are cultivated with more or less success.

The Sikkim species of Rhododendron have now all been described, as far as they are known, and with few exceptions figured, in a manner that will ensure the recognition of our seedlings when they blossom; but it must not be expected that the flowers, so impatiently looked for, will in all or perhaps in most cases equal, in number and size, those of the drawings made on the spot, which were in many instances from the choicest bouquets that could be procured over a large extent of country.

Unexampled success has attended cultivators in the germination of the seeds. Seedlings have been raised in quantities; but whereas in some cases the young plants have, with few exceptions, been all reared, in others the whole crop has been lost through injudicious treatment. The different kinds are at present kept together and treated alike; there is no discrimination exercised in their culture; the same amount of light and heat as is given to the natives of 6,000 and 7,000 feet elevation, which are in full leaf throughout the year, is also given to those from 15,000 feet, whose vegetative organs are in activity for only five or six months of the twelve. This course will eventually prove prejudicial, for it is not possible that the alpine kinds can long endure the excitement of perennial heat and moisture.

Variation.—There is a prevailing disposition to limit the species of this genus by characters presented in the seedling plants, and to argue, from my inability to pronounce arbitrarily on the same in our greenhouses, the probability of there being fewer or more species than of names received with the seeds. In some cases an undue value is given to these names. Slight variations in the strength of the stem, colour, texture, and hairiness of the leaf, are regarded as certainly indicating specific differences; whilst other kinds are considered as the same, because undistinguishable in their present infant condition. Some of the latter certainly resemble one another in foliage, even when full grown, but are nevertheless totally distinct in flower and in fruit. I may instance R. *cinnabarinum*, R. *camelliæflorum*, and R. *Maddeni*, as one case in point; R. *campylocarpum*, and R. *Thomsoni* as another; R. *campanulatum*, and R. *fulgens* as a third instance of species being often so alike in the leaf, as generally to puzzle me when I had nothing else to judge by; and yet there is in the two former cases little affinity between them. My attention was drawn to this point throughout a residence of many consecutive months (including the flowering and fruiting seasons of the Rhododendron) at elevations varying from 8,000 to 16,000 feet. It is especially between 10,000 and 14,000 feet that the genus prevails; several species comprising three-quarters of the bulk of the vegetation above the forest-region (12,000 feet). There Rhododendron wood supplies the native with fuel, and, from its tough nature and property of being easily worked, with many domestic utensils, poles for his tent, stools, saddle, bowl and spoon; the bark is used as that of the birch is in arctic regions, and the leaves serve as plates and wrappers for butter, curd, and cheese. It is the traveller's constant companion throughout every day's march; on the right hand and on the left of the devious paths, the old trees and bushes are seen breast high or branching over head, whilst the seedlings cover every mossy bank. At 13,000 feet the flanks of the snowy mountains glow with the blood-red blossoms of R. *fulgens,* whilst the beauty of R. *campanulatum* and the great elegance and delicacy of the white bells of R. *campylocarpum* excite the more admiration from their being found in such regions of fog and rain. Yet with all these advantages of position, and that of an intimate knowledge of the species, I was constantly at a loss to distinguish to which species the seedling plants belonged, especially when they grew intermixed, or to recognize others when distant from their parents.

Not only does the very variable nature of the foliage render it exceedingly difficult to recognize even the best known kinds by these organs, but the species themselves run into races, stripes, or constant varieties, assuming under certain circumstances characters inherited by the seedlings. This is habitually the case with those that have considerable ranges in elevation; they alter their habit materially (as willows do in our own country), and there is more apparent difference between the robust, hardy, rusty-leaved, dark-coloured seedlings from an alpine locality, and the young plants of the same species from wooded regions lower down, than between some widely distinct species. I have hereby been led into much error in my illustrated work on Sikkim Rhododendrons, which I shall endeavour to remedy in the present essay.

Hybridization in a Native State.—It has been insisted that many of the so-called species of this genus are naturally-produced hybrids. This is by no means clear to me, though I am far from denying its possibility, and I am aware of the many obvious facilities for such a process: it shares the plausibility of all hypotheses against which negative proof only can be brought to bear. A gardener's opinion is in such cases of value, as he can best appreciate the power of an agent he employs himself with great effect, and to which the attention of botanists is being drawn through the pages of this Journal especially. Considering, however, the consequences which have attended the process of hybridizing Rhododendrons in our gardens, it appears to me that were such an operation actively pursued by nature, or tardily throughout a series of years, in the Rhododendron region of the Himalaya, the species would be in the condition of *Salix*, *Rubus*, *Rosa*, *Mentha*, and many other familiar examples of hopelessly entangled assemblages of species. Where the Rhododendron "scrub" prevails, it is impossible for any but very strong growing plants to establish a footing; a mule would have little chance of a flourishing existence and numerous offspring in so dense a mass; but the prevalence of land and snow-slips often lays bare broad tracts of land, which are for years but scantily clothed with vegetation. From the constant local changes of surface that hence ensue, there is no want of opportunity and space for hybrids to establish themselves. Believing it probable that this genus has survived slow but great changes in the physical geography and climate of the country, especially with relation to the snow-level, I cannot but conclude that varieties, perhaps permanent ones, may have been induced, which are now regarded as species; and this has prompted me to unite some plants from very different elevations which, though varying much, present no well-marked specific characters. Such are R. *elæagnoides*, *R. salignum*, and *R. obovatum*. All these I include under Wallich's *R. lepidotum*, to which a range in elevation of upwards of 7,000 feet is consequently given, but I cannot trace the influence of hybridization in itself or any allied species. It is accompanied by twenty congeners in its ascent from 7,000 to 15,000 feet, but except that its flowers vary from yellow to a dirty purple, at various heights, neither it nor they present any characters that can be attributed to hybridization. R. *fulgens* is the most suspicious looking plant in this respect, having the leaves of R. *campanulatum*, and capitula and flowers of a scarlet variety of R. *arboreum*; but considering how variable R. *campanulatum* is in colour, and that it assumes a denser capitulum in its variety *æruginosum* (which I published as a species), I should be more inclined to rank R. *fulgens* as a permanent variety of that species than as a mule between it and a plant with a totally dissimilar leaf, which is comparatively tender, and which grows 4,000 feet lower down. The principle of hybridization is a dangerous one to admit heedlessly in these cases, and should only be resorted to as a forlorn hope, when every other attempt to account for the Protean habits of an assemblage of species has failed: such I cannot consider to be the case with the Sikkim Rhododendrons; and though I do not abandon the idea in theory, I shall not adopt it in this emergency.

Epiphytical Habits of some Species.—Much undue importance has been given to the fact of some kinds growing habitually epiphytically (R. *Dalhousiæ*, R. *camelliæflorum*, R. *pendulum*), and it has been supposed that much difficulty must attend their cultivation. Having occasionally seen all these species growing on rocks, and the two latter sometimes becoming erect, and that always in exposed but very moist localities, I have been induced to attribute their predilection for the branches of trees to their weak habit and want of light elsewhere. Being plants of the forest region, and unable to contend against the vigorous undergrowth that prevails there, the offspring of such seeds as fall on the ground are choked, whilst the perennially humid atmosphere supports such as sprout on the mossy limbs of trees, where they receive the stimulus of light. R. *Dalhousiæ*, for instance, which is never found on the ground in the woods of Darjiling, grows in thousands on the clay and mould banks of the roads which are cut through the forest, the young plants coming up in profusion as soon as the cuttings are made: these, however, seldom attain any size, from the too great exposure of the soil, which in the dry season rapidly parches during a short day's heat. In Dr. Campbell's garden at Darjiling there is a perpendicular bank, 15 feet high, exposed to the west, and partly sheltered from the south-west by a house. R. *Dalhousiæ* has annually appeared on this, the seeds being imported by winds or birds from the neighbouring forest. The seedlings, however, perished till within the last two years, since which time abundance of *Lycopodium clavatum* and a *Selaginella*, with *Marchantia*, *retain so constant a supply of moisture that the plants now flourish and flower in perfection. Though not equal to the herbaceous, the* number of small shrubby forest plants that grow on the trees in these damp regions is very great, especially the orchideous. Those that do so most habitually are species of *Vaccinium* (*serpens* and others). These are all provided with soft woody swellings on the root, of all sizes, from that of a nut to the thickness of a man's thigh, which, though structurally the same as other parts of the root, serve as reservoirs for a great quantity of fluid destined to nourish the plant in the drier season of the year. These plants never grow on the ground, properly speaking, but often on exposed rocks, where the use of those tubers is more evident, and it is a part of their economy to be so provided. The Rhododendrons have never such organs, and there is no difference between the root of a specimen grown on the ground and one from a mossy tree-trunk. Such species as are habitually epiphytical require a lighter soil, with plenty of moss, and a very damp, humid, equable temperature; and will, I am sure, present no insuperable obstacles to the cultivator.

Soil.—There is in this respect little variety throughout Sikkim, and, as far as vegetation is concerned, it may be divided into vegetable mould and stiff clay—each, as they usually occur, remarkably characteristic in composition of such soils.

The clay is uniformly of great tenacity, and is, I believe, wholly due to the effect of the atmosphere on crumbling gneiss and other rocks. It is tenacious, seldom friable, and sometimes accumulated in beds 14 feet thick, although more generally of only about 2 feet. In certain localities, beds or narrow seams of purer felspathic clay on vegetable matter occur in it, probably wholly due to local causes. An analysis of that near Darjiling gives about 30 per cent. of alumina, the rest silica, and a fraction of oxide of iron. Lime is wholly unknown as a constituent of the soil, and only occasionally seen as a stalactitic deposit from a few springs.

The vegetation has always good drainage, from the broken nature of the subjacent highly-inclined stratified rocks: with the Rhododendrons of the second zone this is especially the case, and they thrive luxuriantly on the soil overlying old moraines.

A layer of vegetable earth almost invariably covers the clay for the depth of 3 to 12 or 14 inches. It is a very rich black mould, held in its position on the slopes of the hills by the dense vegetation, and accumulated by the banks of small streams to a depth at times of 3 and 4 feet. R. *arboreum* is one of the few species that seem to avoid this soil, but, I think, in appearance only —that species loving exposure, and therefore occupying a comparatively poor dry soil, over which other things do not extend. I have seen R. *arboreum* and *barbatum* growing on the margins of pools of water, in what is almost bog earth; but pools and bogs are rare in Sikkim, and of very local occurrence. The following is an analysis of an average specimen of the surface-soil of Darjiling, made for me by my friend C. J. Müller, Esq., of that place :—

A.—Dry Earth.

Anhydrous,	83·84
Water,	16·16
	100·0

B.—Anhydrous Earth.

Humic acid,	3·89
Humine,	4·61
Undecomposed vegetable matter,	20·98
Peroxide of iron and manganese,	7·05
Alumina,	8·95
Silicious matter, insoluble in dilute hydrochloric acid,	54·52
Traces of soda and muriatic acid,	..
	100·0

C.—Soluble in water, gr. 1·26, consisting of soda, muriatic acid, organic matter, and silica.

The soil from which this example was taken was 12 inches deep; it abounded to the eye in vegetable matter, and was silicious to the touch. There were no traces of phosphates or of animal matter, and doubtful traces of lime and potash. The subsoil of clay gave only 5·7 per cent. of water and 5·55 of organic matter. The above analysis was conducted during the rainy month of September, and the sample is an average one of the surface-soil at 6,000 to 10,000 feet. There is, I think, little difference anywhere in the soils at this elevation, except where the rock is remarkably micaceous, or where veins of felspathic granite, by their decomposition, give rise to small beds of kaolin.

In elevations above 10,000 feet, the rocks are generally much harder, the gneisses and schists are baked by metamorphic action, and more granitic rocks prevailing, a lighter and more sandy soil is met with. Towards the southern parts of Sikkim, the copious rains wash away at once the scanty annual deposit of humus at these great elevations: there is consequently no sward or peat; the plants, shrubby and herbaceous, growing out of a generally naked soil in tufts. In the northern parts, again, there is a considerable accumulation; and at equal and greater elevations a sward of *Cyperaceæ* and *Gramineæ* are found, nourishing a tolerably rich Flora. Further north still, in the Tibetan climates, at 15,000 to 17,000 feet, the climate is too dry for anything but an arid Flora, except along the borders of streams.

Generally speaking, I conclude that a rich light vegetable mould of loam and peat, with good drainage, are necessary for the shrubby plants of these regions.

On the Species.—Since the preparation of the several parts of the illustrated work on the Sikkim Rhododendrons, my opinions, which were then far from fixed as to the limits of some of the species, have changed, with the many additions to the localities, &c., I have collected. When the first part was published, I had only seen single specimens of some of the species figured; and without books of reference of any kind, I was unable to determine their names; the specimens and drawings sent differed so widely from cultivated individuals, and from the indifferent herbarium specimens attainable, that they were pronounced new, and published accordingly. The results of a careful study of all my species and specimens are, that of those figured in the first part R. *Campbelliæ* does not differ from R. *arboreum*, R. *lancifolium* from R. *barbatum*, R. *Wallichii* from R. *campanulatum*, and R. *Roylei* from R. *cinabarinum*.

In the second part a synoptical view of all the Indian species is given, in which some of these errors are indicated, and the species are thrown into groups defined by characters I still think natural and constant. In this and in the concluding (third) part 22 more Rhododendrons are figured as species, several of which were regarded by myself as well-marked forms or varieties only, and such as worth figuring, but which were published with the provisional specific names I attached to them. To these I shall allude hereafter. Lastly, I have gone over the Bhotan collections of Mr. Griffith, and identified all his 14 species with my own, except the one figured by Dr. Wight as R. *grande*. Of this I find no specimen in the set of Griffith's plants given to Sir W. Hooker, except it be the R. *Hodgsoni*, which I can hardly reconcile with the plate and description in Dr. Wight's Icones. Dr. Wight's R. *Griffithii*, on the other hand, I find to be founded on a very starved state of R. *Aucklandii*, a name which I waive.

Bhotan borders upon Sikkim to the eastward, and presents the same characters of humidity in that western part (whence Mr. Griffith's specimens were procured) as Sikkim does. Its lower and outer ranges of hills, however, being drier (from reasons hereafter to be explained), it does not appear to be so rich in Rhododendrons, and hence probably no peculiar species are found; for to the eastward of Bhotan again, in the "Durrung" country, other species have been discovered by Mr. Booth.

I shall now give a list of the 27 Sikkim species known to me, arranged in natural groups, with such brief characters as are necessary for determining them when they shall flower. An account of the geographical features of Sikkim will follow, and a division of the country into zones, each inhabited by a different vegetation of Rhododendrons and other plants. Some more general description of the species, with remarks on their appearance, habits and relations to soil, climate, &c., will naturally be brought in there ; and I shall conclude with a rather minute account of the climate, temperature &c., of the three zones of the Himalaya, which may be termed Temperate, Alpine, and Arctic, and which are best defined by the limits attained by *Coniferæ* and *Rhododendrons*.

Synopsis of Species.

§ I. *Calyx* 0. *Corolla* broadly bell-shaped, 10-lobed. *Stamens* 18 to 20 (rarely 10). *Ovary* usually hairy or viscid, or both, many-celled.—Trees with large leaves, and white or pale-coloured densely clustered flowers.

1. R. *Falconeri*—a tree ; leaves very large and coriaceous, obovate or oblong, blunt, on very stout leaf-stalks, smooth, shining above, with sunk netted veins, below covered with thick rusty down ; flower-stalks viscid ; flowers white, in dense heads ; stamens 16 ; style thick, with a club-shaped broad stigma.—*Sikkim Rhod.* Pl. X.

2. R. *argenteum*—a tree ; leaves very large, obovate, oblong, sharp, narrowed into the thick leaf-stalk, quite smooth on both sides, silvery below ; heads rather loose, 10-flowered ; flower-stalks short, downy ; flowers white, broadly bell-shaped ; stamens 10 ; ovary downy, about 16-celled.—*Sikkim Rhod.* Pl. IX.

3. R. *Hodgsoni*—a large bush ; leaves broad, elliptical, obovate or oblong, on stout leaf-stalks, sometimes heart-shaped at the base, smooth and shining above, somewhat silvery below, with closely appressed down ; heads 15 to 30 flowered ; flower-stalks short, downy ; flowers broadly bell-shaped, 8 to 10 lobed, pale purple ; stamens 16 to 18 ; ovary downy, 16-celled.—*Sikkim Rhod.* Pl. XV.

§ II. *Caylx* cup-shaped, more or less broad and deep, very obscurely lobed. *Corolla* 5-lobed. *Stamens* 10 to 16. *Ovary* 6 to 16-celled.—Shrubs with large flowers, and quite smooth leaves.

4. R. *Griffithii*, Wight (R. *Aucklandii Sikkim Rhod.* Pl. XI.)—leaves on rather long foot-stalks, oval, oblong, sharp, somewhat cordate at the base, quite smooth on both sides ; flowers few, on long foot-stalks ; calyx a broad open disc, unequally 5-lobed ; corolla white, with a broad tube, and 5 very broad spreading lobes ; stamens 12 to 18 ; ovary glandular, 12-celled.

5. R. *Thomsoni*—a bush ; leaves at the end of the branches, orbicular or broadly oblong, rounded at the end or terminating in a short point, on rather long leaf-stalks, heart-shaped at the base, quite smooth on both

sides, rather glaucous below; head 4 to 6 flowered; flowers deep crimson, drooping, on long foot-stalks; calyx cup-shaped, sometimes tubular, unequally lobed; tube of the corolla rather long, bell-shaped, lobes recurved, notched; stamens 10; ovary quite smooth, 6 to 10-celled.—*Sikkim Rhod.* Pl. XII.; and R. *candelabrum*, Pl. XXIX.

§ III. *Calyx* of 5 leaves, or deeply 5-lobed. *Corolla* funnel or bell-shaped. *Stamens* 10 to 18. *Ovary* 5 to 6-celled.—Trees or shrubs; sometimes epiphytes, with the leaves often covered with small scales.

6. R. *Dalhousiæ*—a slender shrub; young leaves with long hairs, the older ones elliptico-obovate, blunt, smooth above, rather glaucous below, and dotted with very small scales, narrowed at the base into a leaf-stalk which is sometimes a little hairy; flowers 3 to 5 in a head, nodding; sepals oblong, blunt, hairy on the margin; corolla bell-shaped, with a broad tube and 5 moderately spreading lobes; stamens 10; ovary 5-celled.—*Sikkim Rhod.*, Pl. I. and II.

7. R. *Edgeworthii*—a straggling shrub, generally growing on the branches of trees; branchlets leaf and flower-stalks densely covered with a thick tawny down; leaves elliptical, ovate, very sharp, bright green and shining above, reticulated with sunk veins; flowers 2 to 3 together, large, white; flower-stalk short; sepals woolly, blunt; tube of the corolla rather short, lobes large and spreading; stamens 10; ovary very woolly, about 5-celled.—*Sikkim Rhod.*, Pl. XXI.

8. R. *barbatum*, Wall.—a small tree; leaves elliptical, lanceolate, sharp, blunt at the base, with stout leaf-stalks which have generally long bristles; quite smooth on both sides, paler below; flowers in dense heads, pale blood-red; flower-stalks short; sepals oblong, blunt, viscid; stamens 10; ovary viscid and hairy, 5 to 8-celled.—*Sikkim Rhod.*, Pl. III.; and R. *lancifolium*, Pl. IV.

9. R. *ciliatum*—a low rigid shrub; branches leaf and flower-stalks covered with stiff spreading hairs; leaves on short foot-stalks, elliptical, obovate, very sharp, bright green above, the margins and mid-rib with stiff spreading hairs, paler and rather glaucous below, dotted with small scales; flowers 4 or 5 together, pale purple, on stout short flower-stalks; sepals broadly ovate, blunt, ciliated at the margin; corolla bell-shaped, with spreading recurved lobes; stamens 10; ovary scaly, 5-celled.—*Sikkim Rhod.*, Pl. XXIV.

10. R. *glaucum*—a small slender shrub; branchlets leaf and flower-stalks and the leaves generally on both sides, calyx and ovary dotted with small scales; leaves obovate, lanceolate, pointed, narrowed into a slender leaf-stalk, bright green above, very glaucous below; flowers 6 or 8 in a head, pale pink purple; sepals oblong, sharp; corolla bell-shaped, dotted with

small glands, and hairy inside at the base; stamens 10; ovary 5-celled.—*Sikkim Rhod.*, Pl. XVII.

11. R. *pumilum*—a very small, slender, sparingly-branched Alpine shrub, with creeping stem and erect branches, which, as well as the flower and leaf-stalks, underside of the leaves, calyx and ovary, are dotted with small brown scales; leaves small, on very short foot-stalks, broadly elliptical, blunt with a short point, margin recurved, dark green above, glaucous below; flowers nodding, solitary, or 2 to 3 on long erect stalks; sepals blunt; corolla bell-shaped, rosy, tube hairy, lobes short, rather spreading; stamens 10; ovary 5-celled.—*Sikkim Rhod.*, Pl. XIV.

§ IV. *Calyx* small or none. *Corolla* bell or funnel-shaped. *Stamens* 10. *Ovary* 5 to 10 celled.—Shrubs or small trees, generally smooth.

12. R. *arboreum*—a tree; leaves very coriaceous, lanceolate, acute, cordate at the base, or narrowed into a stout petiole, bright green above, reticulated with sunk veins below, smooth and silvery, or covered with a rusty down; flowers in dense heads; calyx none; corolla bell-shaped, white, pink, or blood-red; stamens about 10; ovary 7 to 10-celled.—*Sikkim Rhod.*, R. *Campbelliæ*. Pl. VI.

13. R. *niveum*—a small tree; branchlets and underside of leaves leaf and flower-stalks thickly covered with wool; leaves obovate, lanceolate, blunt or sharp, on short foot-stalks, quite smooth above, opaque; flower-stalks short; capsules short, downy, 6-celled.

14. R. *campanulatum*—a densely branched shrub; branchlets leaf and flower-stalks underside of leaves more or less covered with a thick down; leaves obovate, sharp or blunt, cordate at the base, on stout leaf-stalks, smooth and bright green above, sometimes also almost smooth below; flowers 8 to 10 in loose heads, rose or lilac, sometimes spotted; flower-stalks rather long; calyx with 5 short blunt teeth; corolla bell-shaped, with recurved lobes; stamens 10; ovary quite smooth, 5 to 8 celled.—R. *Wallichii*; *Sikkim Rhod.*, Pl. V.; and R *æruginosum*, Pl. XXII.

15. R. *fulgens*—a small bush, differing only from R. campanulatum in its dense heads of blood-red flowers, which resemble those of R. arboreum; and in the capsule, which is broader and of a fine purple colour.—*Sikkim Rhod.*, Pl. XXV.

16. R. *lanatum*—a small tree; branchlets flower and leaf-stalks underside of leaves and ovary densely covered with a whitish wool; leaves obovate, blunt with a short point, narrowed into a short foot-stalk; flowers 6 to 8 in a loose head, nodding; flower-stalks rather long; calyx of 5 small blunt teeth; corolla broadly bell-shaped, pale straw colour, with purple spots inside; stamens 10; ovary 5-celled.—*Sikkim Rhod.*, Pl. XVI.

17. R. *Whightii*—a large branching shrub; elliptical, lanceolate, sharp, narrowed below into a stout downy leaf-stalk, smooth and bright green above,

covered beneath with a closely pressed reddish down; heads large, rather loose, and many flowered, on downy foot-stalks; calyx of 5 very small teeth; corolla broadly bell-shaped, 5-lobed at the base, straw-coloured, spotted above with red; stamens 10; ovary glandular and downy, 10-celled.—*Sikkim Rhod.*, Pl. XXVII.

18. R. *campylocarpum*—a shrub, with slender branches; leaves ovate or oblong, blunt with a short point, heart-shaped at the base, smooth and shining above, paler and rather glaucous below; leaf-stalks slender, as are the flower-stalks, which, as well as the calyx and ovary, are more or less covered with glandular hairs; flowers nodding, 5 to 10 in loose heads; calyx of 5 small rounded lobes; corolla broadly bell-shaped, with spreading lobes, pure white or pale straw colour, stamens 10; ovary 5-celled.—*Sikkim Rhod*, Pl. XXX.

§ V. *Calyx* of 5 short lobes or teeth, the upper sometimes elongated. *Corolla* funnel-shaped, tube narrow. *Stamens* 10 to 20. *Ovary* 5 to 10-celled. —Shrubs with the leaves scaly on the underside.

19. R. *Maddeni* –an erect twiggy shrub; branchlets leaf and flower-stalks underside of leaves calyx and ovary thickly studded with small scales, which are also scattered over the tube of the corolla; leaves elliptic, lanceolate, sharp at both ends, bright green and shining above, tawny below; flowers nodding, white, very large, 2 or 3 together, on short stalks; tube of the corolla elongated with 5 spreading lobes; stamens 18 to 20; ovary 10-celled. —*Sikkim Rhod.*, Pl. XVIII.

20. R. *cinnabarinum*—a shrub with slender branches; underside of leaves leaf and flower stalks calyx and ovary studded with small scales; leaves ovate or oblong, lanceolate, sharp at both ends, rather opaque, green above, tawny or rusty coloured below; flowers rather small, nodding, 4 to 8 together, in loose heads; calyx lobes very variable in size; corolla brick-red, tube long, lobes rounded, spreading, rather sharp; stamens 10; ovary 5-celled. —*Sikkim Rhod.*, Pl. VIII.; and *R. Roylei*, Pl. VII. (neither very characteristic figures.)

§ VI. *Calyx* of 5 lobes. *Corolla* with the tube very short and swollen, the lobes spreading, concave. *Stamens* 8 to 10. *Style* short and curved. *Ovary* 5-celled.—Generally small shrubs, sometimes epiphytes. Leaves (except in R. pendulum) densely scaly.

21. R. *camelliæflorum*—a slender shrub, generally pendulous from the branches of trees; branchlets flower and leaf-stalks under surface of the leaves calyx and ovary densely dotted with small scales; leaves elliptical, lanceolate, sharp at the end, generally blunt at the base, bright green above, brownish beneath, on short stout foot-stalks; flowers solitary or 2 together,

on short curved stalks ; sepals thick and blunt ; corolla white, of a firm thick texture, dotted with scales ; stamens 16 ; filaments short and thick ; ovary 10-celled. *Sikkim Rhod.*, Pl. XXVIII.

22. R. *pendulum*—a very slender shrub, generally hanging from the branches of trees ; branchlets leaf and flower stalks calyx and ovary densely covered with a rusty-brown wool, under which are scattered scales ; leaves elliptical, blunt with a short point, on very short leaf-stalks, bright green and shining above ; flowers 2 together, small, white ; sepals membranous oblong, blunt ; corolla sparingly scaly outside ; tube short ; lobes large, spreading ; stamens 10 ; filaments woolly ; ovary 5-celled.—*Sikkim Rhod.*, Pl. XIII.

23. R. *lepidotum*, Wall.—A small branching bush ; the branchlets leaf and flower stalks leaves generally on both sides calyx and corolla, externally more or less dotted with white or rusty brown scales ; leaves obovate, lanceolate, or oblong, on short petioles, of a pale or lurid green colour ; flowers terminal, solitary,or 2 to 3 together on slender erect stalks ; sepals 5, blunt ; corolla pale or deep yellow, or purple ; tube short, globose ; lobes spreading, concave, the upper more or less spotted ; stamens 8 ; ovary 5-celled.—*R. salignum ; Sikkim Rhod.*, Pl. XXIII. A. ; *R. elæagnoides*, Pl. XXIII. ; *R. obovatum*, part 2, page 6.

24. R. *vaccinioides*,—a small, very slender, sparingly branched shrub, sometimes epiphytical, with the branches scarred ; branchlets leaf and flower stalks and underside of leaves sparingly scaly ; leaves coriaceous, obovate, blunt or notched, narrowed into a short stalk, quite smooth and bright green above, paler below ; flowers solitary, terminal, on slender stalks ; sepals ovate ; lobes spreading, rounded ; stamens 10, exserted ; filaments hairy ; ovary 5-celled.— *Sikkim Rhod.*, part 2, page 3.

§ VII. *Calyx* of 5 short lobes. *Corolla* with the tube short, funnel-shaped, lobes long, narrow, spreading. *Stamens* 8. *Style* slender. *Ovary* 5-celled.—Small scaly shrubs, with Azalea-like flowers.

25. R. *virgatum*—a slender erect shrub ; branchlets leaf and flower stalks underside of leaves calyx and ovary densely studded with scales ; leaves linear, oblong or ovate, sharp or blunt with a short point, rounded or cordate at the base on short foot-stalks, bright green and shining above, glaucous and sometimes rusty below ; flowers 2 to 3 together, nodding on rather long stalks, yellow or pale purple ; calyx lobes rounded, ciliated ; corolla variable in size ; tube short, conical ; lobes 5, oblong, blunt ; stamens 8 to 10 ; ovary 5-celled.—*Sikkim Rhod.*, Pl. XXVI, A. ; and *R. triforum*, Pl. XIX.

26. R. *setosum*, Don—a very small shrub ; branchlets leaf-stalks and margins of the leaves bristly ; these parts, as well as the flower-stalks both sides of the leaves calyx and ovary densely scaly ; leaves on short foot-stalks, small, oblong or obovate, deep green above, rather glaucous below ; flowers red-pur-

ple, 2 to 4 together, terminal on rather short stalks ; sepals 5, oblong, blunt ; tube of the corolla very short ; lobes linear, oblong, spreading ; stamens 8 to 10, exserted ; ovary 5-celled.—*Sikkim Rhod.*, Pl. XX.

27. R. *nivale*—a small, depressed, prostrate, spreading shrub, with very woody stem branches, everywhere studded (except the corolla) with scales ; leaves crowded, very small, elliptical, blunt, almost sessile, lurid green ; flowers terminal, solitary, on very short stalks ; sepals 5, oblong, blunt ; corolla pink purple ; tube very short, hairy inside ; lobes oblong, blunt ; stamens 8 to 10 ; anthers large ; ovary 5-celled.—*Sikkim Rhod.*, Pl. XXVI., B.

§ VIII. *Calyx* of 5 membranous sepals. *Corolla*, salver-shaped, tube slender, short, cylindrical, lobes flat, spreading. *Stamens* 6 to 8, within the tube. *Style* short. *Ovary* 5-celled.—A small scaly shrub.

28. R. *anthopogon*, Don—the only species.

If from a consideration of the species themselves we turn to that of the country they inhabit, it will be found that a great part of it is characterized by perennial humidity, which is excessive during the summer months. It will be seen, also, that the degree of humidity varies in different parts of the country, and that the rain-fall is unequally distributed ; also that elevation is to a great degree a relative term, equal altitudes having different climates in various parts of Sikkim, with a dissimilar vegetation. To explain these points, it is necessary to give some account of the natural features of the Sikkim Himalaya Mountains, which seem to be little known, or generally misunderstood by those who have sought information respecting the management of Rhododendrons, through the various horticultural periodicals. Except these points are clearly understood, it will be impossible to appreciate the conditions under which the species grow.

Sikkim is included in a section of the Himalaya Mountains about sixty miles broad from east to west, where it is bounded respectively by the mountain states of Nepal and Bhotan. Its southern limits are easily defined, for the mountains rise rather abruptly from the plains of Bengal, as spurs of 6,000 to 10,000 feet high, densely clothed with forest to their summits. The northern and north-eastern frontier of Sikkim is beyond the region of Rhododendrons, and is not a natural but a political line, drawn between itself and Tibet. Sikkim is nearly due north of Calcutta, and only 400 miles from the sea at the Bay of Bengal ; its latitude being 26° 40′ to 28° N., and longitude 88° to 90° E. The greater part of the country between Sikkim and the sea is a dead level, occupied by the delta of the Ganges and Burrampooter, above which the slope is so gradual to the base of the mountains, that the surface of the plain from which the Himalayas immediately rise is only 300 feet above the sea. The most obvious effect of this position is, that the prevailing southerly wind reaches the first ranges of hills loaded with vapour.

The same current, when deflected easterly to Bhotan, or westerly to Nepal and the north-west Himalaya, is intercepted and drained of much moisture, by the Khassya and Garrow Mountains (south of Assam and the Burrampooter) in the former case, and the Rajmahal hills (south of the Ganges) in the latter. Sikkim is hence the dampest region of the whole Himalaya.

Viewed from a distance on the plains of India, Sikkim presents the appearance—common to all mountainous countries—of consecutive parallel (wooded) ridges, running east and west, backed by a beautiful line of snowy peaks, with occasional breaks in the foremost ranges, through which the rivers debouch. Any view of the Himalaya, especially at a sufficient distance for the distant snowy peaks to be seen overtopping the outer ridges, is very rare, from the constant deposition of vapours over the forest-clad ranges during the greater part of the year, and the haziness of the dry atmosphere of the plains in the winter months. At the end of the rains, when the S.E. monsoon has ceased to blow with constancy, views are obtained, sometimes from a distance of nearly 200 miles. The angle subtended by the giant peaks is so low (not a degree) that they appear like white specks very low on the horizon, tipping the black lower and outer wooded ranges, which always rest on a belt of haze, and from the density, probably, of the lower strata of atmosphere, are never seen to rest on the visible horizon. The remarkable lowness on the horizon of the whole stupendous mass is always a disappointing feature to the new comer, who expects to see dazzling peaks towering in the air. Approaching nearer, the snowy mountains sink behind the wooded ones long before the latter have assumed gigantic proportions, and when they increase in size, they appear a sombre, lurid grey-green mass of vegetation, with no brightness or variation of colour. There is no break in this forest caused by rock, precipice, or cultivation; some spurs project nearer, and some valleys appear to retire further into the heart of the first great chain that shuts out all the country beyond. No pines whatever are seen on the outer range of Sikkim, both soil and climate being far too damp in the rainy season; nor are the colours of the foliage so varied and bright as the more perennially humid forests of tropical shores, from the want of any abundance of such palms as *Caryota*, tall *Arecæ*, and of *Artocarpi*, or of orange-groves.

As it is not my purpose to discuss here the tropical, or lower zone of Sikkim, I shall at once transport the reader to the north side of the first range of mountains. From here it will be seen that the appearance of parallel ridges is due to the inosculating spurs of long tortuous ranges that run north and south throughout the whole length of Sikkim, dividing deep wooded valleys, which form the beds of large rivers. The snowy peaks still look like a long east and west range of mountains, at an average distance of 30 or 40 miles from the outer range. Advancing into the country, this appearance proves equally deceptive, and the range of snow is resolved into isolated peaks, situated on the meridional ranges, at distances varying from 30 to 80 miles from the observer; their snowed spurs, projecting east and west, cross one another, and being uniformly white, and all brought by perspective into one line, they appear to connect all the peaks into one grand unbroken range of snow. The rivers, instead of having their sources in the snowy mountains, all rise far beyond them; many of their sources are upwards of 100 miles in a straight line from the plains, in a very curious country, loftier by far in mean elevation than the meridional ridges which run south from it, and though so lofty, comparatively unsnowed. This rearward mountain region is Tibet, and into it all the Sikkim, Nepal, and Bhotan rivers lead, up to a watershed whose discharge to the northward is into the Yarou-Tsampu river, which becomes the Burrampooter of Assam. Tibet is a very arid mountain mass, the southerly wind being exhausted of vapour by these long ridges long before reaching it. The maximum range in latitude and elevation of the Himalayan vegetation is determined very much by the length of the rivers, which, rising in Tibet as small streams, increase in size as they receive the drainage from the snowed parts of the ridges that bound them in their courses. Their banks, between 8,000 and 14,000 feet, are generally clothed with Rhododendrons, sometimes to the almost total exclusion of other woody vegetation, especially near the snowed mountains—a cool temperature and great humidity being the most favourable conditions for the luxuriant growth of this genus.

The source of this humidity is the southerly or sea wind, which blows steadily from May till October in Sikkim, and prevails throughout the rest of the year, if not as the monsoon properly so called, as a current from the moist atmosphere over the Gangetic delta. This rushes north to the rarefied regions of Sikkim, up the great valleys, and do not appear materially disturbed by the north-west wind, which blows during the afternoon of the winter months over the plains, and along the flanks of the outer range, and is a dry surface current, due to the diurnal heating of the soil. When it is considered that this wind, after passing lofty mountains on the outer range, has to traverse 80 or 100 miles of alps before it has watered all the Rhododendron region, it will be evident that its moisture must be expended before it reaches Tibet.

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Though the direction of the main atmospheric current is to the north, it is seldom in reality felt to be so, except the observer is on the very exposed mountain tops, or watches the motions of the upper strata of atmosphere. The lower currents of air rush up both the main and lateral valleys, throughout the day; and from the sinuosities in the beds of the rivers, and generally transverse directions of their feeders, the current often becomes an east or west one. In the branch valleys draining to the north the wind *still ascends; it is, in short, an ascending warm moist current, whatever course be pursued by the valleys it follows.*

The sides of each valley are hence equally supplied with moisture, though local circumstances render the soil on one or the other flank more or less humid, and favourable to a luxuriant vegetation: such difference are a drier soil on the north side, with a too free exposure to the sun at low elevations, where its rays, however transient, rapidly dry the ground, and where the rains, though very heavy, are of shorter duration, and owing to the capacity of the heated air for retaining moisture, day fogs are comparatively rare. In the northern parts of Sikkim, again, some of the lateral valleys are so placed that the moist wind strikes the side facing the south and keeps it very humid, whilst the returning cold current from the neighbouring Tibetan mountains impinges against the side facing the north, which is hence nearly bare of vegetation. An infinite number of local peculiarities will suggest themselves to any one conversant with physical geography, as causing unequal local distribution of light, heat, and moisture in the different valleys of so irregular a country—the amount of slope, and its power of retaining moisture and soil; the composition and hardness of the rocks; their dip and strike; the protection of some valleys by lofty snowed ridges, and the free southern exposures of others at great elevations.

One other peculiarity deserves especial attention, which is, the position of the great masses of perpetual snow. * * * * * *

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Looking eastward or westward on the map of India, the phenomenon of the perpetual snow is regulated by the same laws. From the longitude of Upper Assam in 95° E. to that of Kashmir in 75° E. the lowest limit of perpetual snow is about 15,000 feet, and the mass of Rhododendrons affect the most humid localities near it, at 12,000 to 14,000. Receding from the plains of India and penetrating the mountains, the climate becomes drier, the snow line rises, and vegetation diminishes, whether the elevation of the land increases or decreases, plants reaching 17,000 and 18,000 feet, and the snow line 20,000 feet. To mention extreme cases: the snow level of Sikkim in 27° 30′ is at 15,000 feet, and of vegetation at 14,500; whereas in lat. 35° 30′ Dr. Thomson found the snow line 20,000 feet in Karakorum, and vegetation up to 18,000 feet—features common also to Sikkim in lat. 28°.

Of the Sikkim Rhododendrons I have little further to say except with reference to the individual species, and I shall therefore arrange these in three groups, according to the elevations they inhabit, adding such notes upon each as may prove useful in their determination and assist in their cultivation. No species that I am aware of extends much below 6,000 feet in Sikkim, or in the Himalayas generally, though, according to Mr. Griffith, R. *arboreum* is found below 4,000 on some of the dry rocky outer ranges of Bhotan. In this respect, however, the latter country is very exceptional, and demands a passing notice. The Khassya mountains, as I have elsewhere shown, shield the lower ranges of Bhotan from the effects of the southerly monsoon; they rise to an average height of 5,000 feet, extending (as the Garrows, westward, and Jyntea hills, eastward) for about 250 miles parallel to and 60 miles south of the Bhotan Himalaya, the intervening valley being that of the Burrampooter river. The monsoon from the Bay of Bengal is in this longitude a S. S. W. one, and after traversing 200 miles, partly of the Sunderbunds and partly of a very peculiar marsh district called the Jheels, it discharges an amount of water on the abrupt southern face of the Khassya which, as a rain-fall, I believe has no parallel in the world, amounting to between 400 and 500 inches a-year. Suddenly deprived of one-third of its water, the current pursues its course northward, traversing 30 miles or so of hills, whereby it is cooled; while it is again warmed on the moist valley of Assam. What is thence carried on to the Bhotan Himalaya is not condensed on the mountains till it reaches a considerable elevation, 5,000 feet and upwards, where it is cooled and deposits moisture abundantly. The Bhotan Himalaya is therefore very dry below 5,000 feet, and humid above that, but never so much so as Sikkim.

R. *arboreum* is found at 4,500 feet on the Khassya (but not near the southern edge of the range), and ascends to 7,000 feet. There are several other Khassya species, all avoiding the southern parts, though one of them descends to 2,000 feet on the north flank. Most of the species, as well as those of the Malay peninsula, Java, and Borneo, belong to the same section with R. *cinnabarinum*, having comparatively long tubes to the corolla and small calyces, or none.

The Borneo species[*] gathered by Mr. Low on Kini Balu, below 8,500 feet, belong here; and I may conclude this long discussion with the remark, that, though the Himalaya is so rich in species, it may prove that in this respect it only partakes of the flora of the Malay islands. Thirteen kinds found below 8,500 feet, on a mountain unexplored beyond that height, and in a country but once ascended so high, argues a profusion of species in the mountainous regions of that island of which we can form no adequate idea.

I. Species of the First or Lower Zone, answering to the Temperate latitudes; 6,000 to 10,000 feet.

1. R. *argenteum*.—Distribution and range: *East Nepal* and *Sikkim*; 8,000 to 10,000 feet; confined to the dampest regions.

It forms a tree 30 feet high; trunks solitary, or two or three together, spreading, branched above, the bark pale, and the branches leafy at the apex. Leaves very beautiful in the leaf-buds, at first enveloped in erect and silky scales, so closely imbricated and so large as to resemble the cones of some species of pine; the outer or lower scales broad and coriaceous, glabrous, of a reddish-brown colour, the innermost ones oblong-spathulate, pubescent. When fully developed the leaves are among the largest of the genus, 6 inches to a foot long, 3 to 5 inches broad, full green above, beneath silvery white. Bracteas deciduous, densely silky. Flowers 2 to 3 inches long, 2 to 2½ inches in diameter, inodorous, always white.—In the silvery underside of the foliage, but in nothing else, this resembles R. *arboreum*, while the blossoms are often as large as those of R. *Dalhousiæ*. On Sinchul, the higher parts of the mountain, from 8,000 to 9,000 feet of elevation, are more or less clothed with it; on Tongló, as it approaches 10,000 feet, it is suddenly replaced by R. *Falconeri*. It seemed to be shy of flowering in the season of 1848, for it was with difficulty I could then procure sufficient specimens to complete my drawing; in 1849 it flowered profusely, and, with the white magnolias, formed at a considerable distance a conspicuous object amid the lurid green vegetation of the mountains.

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[*] Many of these species will be figured shortly in Sir W. J. Hooker's "Icones Plantarum."

2. R. *barbatum*.—Distribution and range: *Kemaon, Nepal, Sikkim*, and *Bhotan*; 8,000 to 11,000 feet; confined to the dampest wooded regions.

A tree 30 to 40 feet high, branched from the base. Leaves, in the very young state, sparingly hairy and ciliated; when fully developed, 5 to 7 inches long, and from 1½ to 3 inches wide, elliptical-lanceolate, acute, rather broader above the middle, the margins reflexed and rough from the presence of small harsh hair; the nerves sunk on the upper surface; dull but full green above, paler and quite glabrous beneath, and destitute of scales or down. Petioles sometimes quite deprived of hairs. Flowers moderately sized, blood-colour, collected into a compact globose head 4 to 5 inches in diameter. Bracteas oblong or ovate, the inner ones silky, all more or less glutinous. One of the most beautiful of the Himalayan species, but variable in size and habit. I have seen it forming a low shrub in mossy swamps, and then entirely destitute of bristles on the leaf and flower-stalks; in such a state it was figured and described as R. *lancifolium*.

3. R. *arboreum*.—Distribution and range: *throughout the Himalaya*. 5,000 to 10,000 feet. Most frequent in the drier valleys and ridges.

Of this well known species no description is necessary: it abounds in the inner ranges of Sikkim, descending to 5,000 feet beyond the first great ridge; on that ridge, on the other hand, it is very rare, never descending below 7,500 feet and only appearing in exposed places. It prefers a drier soil and locality than most other species. The leaves are very variable in shape and in the form of their base, which tapers into a foot-stalk or is cordate; their under surface is generally silvery white, but as the species attain higher elevations they become yellower, and finally rusty underneath, as in the variety *Campbelliæ.* The seedlings partake of the habit, colour, and texture of their parents in a remarkable degree, whence the difficulty of recognizing R. *arboreum* under several very common forms in our nurseries. A jelly is made from the flowers of this plant in the N. W. Himalaya, but I have never seen the preparation. The honey of wild bees is at the flowering season said to be poisonous in Sikkim, but opinions are divided as to whether R. *arboreum* or R. *Dalhousiæ* is to blame; if either, I suspect it to be the former, which alone is abundant near the localities where the bees abound.

After a very careful examination, I have come to the conclusion that the R. *Campbelliæ* is only a variety of this; and I further include the R. *nobile*, Wall.; R. *Nilagaricum*, Zenker; and R. *Zeylanicum*. Its geographical distribution is therefore Ceylon, the peninsula of India, the Khassya mountains and the Himalaya mountains from Upper Assam nearly as far west as the Indus; between the elevations of 5,000 and 10,000 in Bhotan, Sikkim, Nepal, and Kemaon, but only between 5,000 and 7,000 elsewhere. It is not found in the valley of Kashmir, but on the south flanks of the mountains bounding that valley on the south.

4. R. *niveum*.—Distribution and range: *Sikkim*—10,000 to 12,000 feet—in moist valleys of the interior.

This species forms a tree so similar to R. *arboreum*, that I much doubt its being distinct. The snowy white down is peculiar, as are the short capsules, and in my ignorance of the flowers I rest its claims upon these characters alone. I have not recognized young plants in cultivation.

5. R. *Dalhousiæ*.—Distribution and range: *East Nepal*, *Sikkim*, and *Bhotan* (Griffith)—6,000 to 9,000 feet—in humid forests, generally growing on limbs of trees.

The seeds of this species have germinated as freely as any, and the young plants are making rapid progress in a cool moist house. The young leaves are very hairy, which character and their tenderness distinguish them. They most resemble R. *ciliatum*, but the latter is more hairy, of a darker colour, and rigid texture.—A straggling shrub, 6 to 8 feet high, generally growing, like tropical Orchideæ, among moss, with ferns and Aroideæ, upon the limbs of large trees: the stems clothed with a reddish, papery bark, the branches straggling in distant whorls; each branch bearing its leaves and flowers only at the extremity. Leaves few, spreading or reflexed, about 4½ to 5 inches in length, foot stalk about ½ an inch long, the margin plane (not revolute), the upper surface darkish green, inclining to yellow; beneath paler, dotted with very small, scattered, rusty-coloured scales. Flowers 3 to 7 in a terminal, umbellate head, the spread of which is greater than that of the leaves. Corolla 3½ to 4½ inches long, and as broad at the mouth; at the contracted base of the tube are 5 deep pits. Lobes of the limb nearly equal, very broad, rounded, waved, spreading. The flowers are white, with an occasional tinge of rose, in size and colour almost resembling those of the white Bourbon Lily *(Lilium candidum)*; in age they assume a delicate roseate tinge, and sometimes become spotted with orange, which rather adds to their beauty than detracts from it. They are lemon-scented, and very fragrant.

6. R. *Griffithii*.—Distribution and range: *Bhotan* and *Sikkim*—7,000 to 9,000 feet—in the valleys and ridges of the interior only, where the climate is drier.

It forms scattered bushes, 4 to 8 feet high, branching from the base where the trunk is 6 inches in diameter. Branches sub-erect, copiously leafy. Bark smooth and papery. Leaves variable in size and breadth, but large for the size of the plant, 4 to 10 inches long; margin plane, often tinged with yellow; upper surface light full green; the under paler, slightly glaucescent. Flowers the largest of the genus, variable in size, terminal, 3 to 5 together, inodorous. Peduncles rather slender, longer than the petioles, red or green. The calyx represents a shallow, concave, irregular, subrhomboid-shaped platter, 1½ inch in its greatest diameter; the back marked with slightly elevated, radiating lines, glossy, as if varnished. Corolla white, tinged with pink, veiny, of a firm, rather fleshy texture: tube short for the size of the flower, yellowish and rose-colour towards the base, the mouth very wide, lobes exceedingly large and spreading. I have measured some only 3 inches across, but others 5 and 5½ inches in diameter!—I have found but few plants of this superb species, and in these the inflorescence varied much in size. The specimens from which the drawing in Sikkim Rhod. (under the name of R. *Aucklandii*, Pl. XI.) was made were from a bush covered with blossoms, growing in a rather dry, sunny exposure, above the village of Choongtam. The same species also grows on the skirts of the pine-forests *(Abies Brunoniana)* above Lamteng, and it is there conspicuous for the abundance rather than for the large size of its blosoms.

When I described this plant I was not aware of its being the R. *Griffithii* of Dr. Wight's Icones Plant. Ind. Or., the drawing of which seems to have been prepared from very bad materials. The great size of the corollas figured in the "Sikkim Rhododendrons" may be due to the individual being sterile, for I found the anthers to contain little or no pollen.

7. R. *Edgeworthii*.—Distribution and range: *Sikkim*—7,000 to 9,000 feet—in forests of the dampest regions.

Leaves 2 to 4 inches long. Corolla white, often tinged with blush or pale yellow: the tube rather short, widening much at the mouth, slightly curved, the limb unusually large, more than 4 inches across, spreading, of 5 nearly equal, rounded, slightly emarginate lobes, crisped at the margin, delicately veined on the surface.—A truly superb species, from the size of the flowers and their roseate tinge on a white ground, also from the variety of rich colour in the leaves, bracteas, stipules, calyx, &c., while the very wrinkled surface of the leaf adds much to its beauty. In its floccose character and foliaceous calyx it resembles R. *pendulum*; but in the size and shape of the flowers it approaches R. *Dalhousiæ*, next to which I would place it. The majority of my specimens were obtained from the land-shoots or slips in the rocky ravines, which bring down in their course those pines on the limbs of which this species delights to grow.

8. R. *Maddeni.*—Distribution and range: *Bhotan* (?) and *Sikkim*—where it was found in the inner and drier valleys only, and very rarely these, at 6,000 feet elevation.

A shrub 6 to 8 feet high. Leaves abundant, of a coriaceous substance but flaccid, 4 to 7 inches long, frequently pendulous. Corolla 3½ to 4 inches long, and as much across the limb, very handsome, white, with a faint blush chiefly on the upper lobe, rather fleshy, but firm in substance; in shape much more contracted than is usual with the Himalayan species: the limb very large, spreading, of 5 nearly equal, rounded, entire lobes, slightly crenato-undulate at the margin, delicately but obscurely veined. The foliage and flowers are faintly odorous.

This species clearly belongs to the same natural group as R. *cinnabarinum*; from which, however, the very large white flowers, the numerous stamens, and ten-celled fruit abundantly distinguish it.

9. R. *ciliatum.*—Distribution and range: *Sikkim*—9,000 to 10,000 feet—in rocky valleys of the interior.

This forms a small, very rigid shrub, growing in clumps 2 feet high, generally in moist rocky places. Odour faintly resinous and pleasant. Corolla 1½ inch long, nearly as much across at the mouth; tube rather contracted below, limb 5-lobed, colour pale reddish-purple; upper lobe obscurely spotted. Allied to R. *barbatum*, but widely different in stature, habit, and the scattered scales on the under surface of the leaves. I have not observed it in other valleys than those flanked by snowy mountains, where it is common, scenting the air in warm weather. The scales (as in its congeners) are orbicular, sessile, attached at the centre, formed of 3 concentric series of cells surrounding a central one, in which a resinous fragrant oil is secreted.

10. R. *virgatum.*—Distribution and range: *Bhotan* and *Sikkim*—7,000 to 9,000 feet—in damp valleys of the interior.

Under this I have included two species figured in the "Sikkim Rhododendrons" which are perhaps only extreme varieties. The characters common to both are a slender twiggy habit, a height of 3 to 6 feet, glaucous leaves, and a perfect identity in all essential characters of inflorescence and fruit. The shape of leaf is a variable one in all cases, as are the size and colour of flower, upon which characters R. *triflorum* was founded. The latter is by far the handsomer plant, and grows at lower elevations. The following remarks apply to it:—

Var. *triflorum* forms a shrub 4 to 6 feet high, with erect and rather twiggy branches. Leaves frequently pendulous, on rather short, slender petioles (⅓ of an inch long), ovato-lanceolate, approaching to oblong or elliptical, 2 or 3 inches long, the margin a little recurved, substance rather thin, upper surface smooth and shining, under quite glabrous and glaucous, but so beset with ferruginous scales as to partake of that colour. Peduncles generally 3 together, terminal, ½ to ⅝ of an inch long, slender, erect. Corolla greenish-yellow, in shape much resembling that of the common garden Azaleas, having a somewhat obconical tube very open at the mouth, and a limb of 5 spreading oblong entire segments, which are slightly veiny, nearly 2 inches across the lobes.

R. *virgatum* itself has stems and branches 4 feet high, scarcely the thickness of a crow-quill. The leaves are in form and size like those of R. *glaucum*. Flowers solitary, rarely in pairs, and axilliary; the pedicels 2 to 3 lines long, covered with sheathing, deciduous, coriaceous, brown scales, which are longer than the pedicel, very rigid in texture, downy on the back. Corolla a pale red-purple, smaller than that of Var. *triflorum*, but of the same form; the tube short, narrow, and obconical, the segments narrow and spreading.

11. R. *vaccinioides*.—Distribution and range: *Sikkim*—6,000 to 8,000 feet—in very moist situations of the outer and inner valleys.

The flowers of this species were unknown to me when I published the second Fasciculus of the "Sikkim Rhododendrons," and I consequently placed the species in a wrong section of the genus. An excellent drawing, prepared by my friend the late Mr. Cathcart, represents the flower and fruit; it will shortly be published in Sir W. Hooker's "Icones Plantarum." In the synoptical account of the species given above I have associated it with R. *camelliæflorum*, &c., with which it further agrees in its frequently epiphytical habit. It is not now alive in this country, and, being of no beauty, it may be long before it is so. In the neighbourhood of Darjiling it is very abundant.

A small, very slender, straggling species, sometimes pendulous from trunks of trees, and then 2 feet long, of a bright green colour, and so like a common Sikkim species of Vaccinium (V. *obovatum*, Wight, Icon., t. 1193) as not to be distinguishable at first sight. Stems no thicker than a dove's quill, rough with tubercles, indicating the former position of scales which still clothe the branchlets, petioles, and more sparingly the under surface of the foliage.

Leaves coriaceous, ¾ to an inch long, obovate or even spathulate, the blade narrowed downwards to the very point where it meets the stem; upper surface a bright green, lower paler. Flower-stalks as long as the leaves, slender. Flowers nodding, white, nearly half an inch across, of the same form as those of R. *setosum* and R. *lepidotum*, having a short, swelling, almost spherical tube, and spreading or recurved round lobes. Stamens projecting far beyond the tube. Seed-vessels curved, unlike those of any other species, being slender and membranous, pale-brown, an inch long, scarcely ⅛ in diameter, valves linear, a little scaly on the back.

II. Species of the Middle or Alpine Zone, answering to the Alpine region of Southern and the Subalpine of Middle and Northern Europe, to the climates of the Scotch Fir, &c, (10,000 to 14,000 feet).

12. R. *Falconeri.*—Distribution and range: *East Nepal* and *Sikkim*—9,000 to 12,000 feet—in moist forests.

A tree 30 feet in height; 2 or 3 trunks springing from the same point, often 2 feet in diameter. Bark pale and smooth; branches few, spreading, leafy at the tops; young leaves clothed with velvety down, and when in bud concealed by downy glutinous scales, of which the outer are subulate, the inner ovate. The perfect leaves are coriaceous, from 8 to 20 inches long, and 5 to 12 inches wide, the upper side glossy green, but fading into yellow at the margins, which are quite plane (not recurved) beneath; clothed with a short, dense, ferruginous down, except on the mid-rib and reticulated veins. Leaf-stalks long and very thick, plane and glabrous above, clothed beneath with dark rusty down. Heads small, composed of numerous white, densely placed flowers. This is a most striking and distinct species, of which the foliage resembles the ferruginous-leaved *Magnolia grandiflora.* The dense many-flowered head, the multiplication of the lobes of the corolla, and of the stamens and fruit-cells, and the exserted style, bring it very near R. *grande* (Wight's Ic. Pl., vol. iv., t. 1202), a Bhotan species found by Mr. Griffith; but the foliage is totally different.

The flowers and leaves of this species usually attain a much larger size than those represented in the "Sikkim Rhododendrons."

13. R. *Hodgsoni.*—Distribution and range: *East Nepal*, *Bhotan*, and *Sikkim*—10,000 to 12,000 feet—in humid forests.

A small tree, from 12 to 20 feet branching from the base, main branches as thick as the human thigh, spreading horizontally 20 or 30 feet every way, interwoven with the adjacent plants and shrubs. Bark smooth, pale flesh-coloured, flaking off in broad membranous patches. Wood white, very close-grained, soft yet tough, neither warping nor splitting, but, in consequence of the great compression of the larger branches, rarely affording a sample a foot square. Leaves terminal on the end branches, ample, spreading, 12 to 18 inches in length, of a singularly thick coriaceous texture, glabrous and bright glossy green above ; beneath, all except the thickened costa, clothed with a pale silvery white, rarely ferruginous, closely appressed wool, but which is *easily rubbed off by the finger, and is often itself evanescent. Heads 4 to 6 inches in diameter, of several delicate, pale purple or rose-coloured flowers Flower-stalks short, viscid, often downy. Corolla large, the tube 1½ inch long,* broadly campanulate, the base depressed at the insertion upon the flower-stalk, the margin of the depression lobed, *limb spreading, 2 to 2½ inches across*, 8-lobed. This, and its associate the *Abies Webbiana*, I have always regarded as characteristic plants of 10,000 to 12,000 feet in all the interior parts of Sikkim. R. *Hodgsoni* in this respect, ranks with R. *arboreum* and R. *Campbelliæ*, being found in a loftier zone of Rhododendrons, succeded by the arctic one of R. *anthopogon*, R. *setosum*, R. *elæagnoides*, and finally, far above the odinary limit of phænogamic vegetation, by R. *nivale*, which is found at an elevation of 18,000 feet. Within the limits assigned to the present species, the traveller's attention is continually arrested by its magnificent and brilliant deep green foliage, as large as that of R. *Falconeri*. In summer the leaves spread all around the plant ; in winter they are rolled up, shrivelled, and pendulous from the tips of the branches. It is found alike at the bottom of the valleys, on the rocky spurs or slopes of the hills, in open places, or in the gloomy pine-groves, often forming an impenetrable thicket, not merely of twigs and foliage, but of thickset limbs and stout trunks, only to be severed with difficulty, on account of the toughness of the wood. As it is easily worked, and not apt to split, it is admirably adapted for use in the parched and arid climate of Tibet ; and the Bhoteas make from it cups, spoons, and ladles, and the saddle, by means of which loads are slung upon the "yak." The leaves are employed as platters, and serve for lining the baskets which contain the mashed pulp of *Arisæma* root (a kind of Colocass) ; and the customary present of butter or curd is always enclosed in this glossy foliage.

14. R. *Thomsoni* (and R. *candelabrum*).—Distribution and range : *East Nepal Sikkim* —11,000 to 13,000 feet—in moist valleys.

A bush 6 to 10 feet high, or in damp woods 15 feet, but then spare and woody. Lower branches stout, a foot in diameter ; upper slender, leafy at the extremities. Leaves 2 to 3 inches long, very broad, much resembling those of R *campylocarpum*, only that in the latter the leaf-stalks are often glandular, here never ; the texture of the leaves is coriaceous, but not very thick, the colour pale green, below sub-glaucous, everywhere quite glabrous. Flowers in a head of 6 or 8 together from the ends of short branches among the leaves, on stalks an inch or more long, which radiate, as it were, from a centre, spreading horizontally, or curving downwards. Corolla remarkable for its almost unrivalled deep blood-red colour and glossy surface, yielding only to R. *fulgens*; deeper coloured than that of R. *arboreum*; the tube elongated, often vertically compressed, 2 inches long; the limb large, spreading; 5-lobed, the lobes notched, upper ones spotted. *This species is perfectly inodorous. In the base of the corolla is secreted much honey, which is not considered poisonous, like that yielded by R. Dalhousiæ and R. argenteum. The two latter species are said to render deleterious the wild honey which is collected during their flowering season.*

15. R. *Wightii.*—Distribution and range: *East Nepal* and *Sikkim*—12,000 to 14,000 feet—alpine valleys, abundant.

A small shrubby tree, yielding, in beauty of inflorescence, to none amongst the yellow-flowered group to which it belongs. The trunks are often as thick as the thigh, and branch very much both upwards and outwards, forming a thickset shrub of 10 feet high. Leaves 6 to 8 (rarely 10) inches long, 2½ to 3 broad, very coriaceous, more plane than is usual in the genus, bright green above, beneath covered with a very closely appressed opaque wool of a deep rufous colour, rarely pale and nearly white in the young foliage. Heads much larger than those of R. *arboreum*; 12 to 20-flowered, the flowers not densely packed. Bracteal scales chesnut-brown, very coriaceous and viscid. Flowers have a faint honeyed smell; foliage inodorous. This exceedingly handsome and abundant species replaces the R. *Hodgsoni* in ascending the mountains, and is the most prevalent species at 12,000 and 13,000 feet, conspicuous at all seasons for its large foliage, of a rusty cinnamon-colour beneath, and for its viscid buds.

16. R. *campanulatum.*—Distribution and range: *Kemaon, Nepal, Sikkim,* and *Bhotan*—10,000 to 14,000 feet—where it is abundant in all parts of Sikkim.

This well-known species is commonly cultivated in our gardens, and requires no particular description. It is wholly inodorous, and the flowers are very variable in colour, being of a deeper or paler lilac, often spotted inside the corolla. The variety I have called *Wallichii* is nearly destitute of wool on the under surface of the leaf, and R. *æruginosum*, another variety, differs only in the purple capsules and curious verdigris-green colour of the young foliage. This and the following are the great ornaments of regions above 12,000 feet, where they often cover the flanks of the valleys with their rich green foliage and gaudy blossoms.

17. R. *fulgens.*—Distribution and range: *Sikkim*—12,000 to 14,000 feet—in the valleys of the interior.

This superb species vies with R. *Thomsoni* in the colour of its dense capitula of flowers. The foliage entirely resembles that of R. *lilacinum*, the flowers those of R. *arboreum*.

18. *R. lanatum.*—*Distribution and range : East Nepal and Sikkim —10,000 to 12,000 feet.*

A large shrub or small tree, with the trunk 6 inches in diameter at the thickest part, irregularly and repeatedly branching ; branches much gnarled and bare of leaves, covered with a dark-coloured rugged bark, very different from the prevailing beautiful papery clothing of the genus ; where it breaks off from the younger branches, however, it exposes a delicate pink inner bark, whilst the branchlets are densely clothed with a soft, appressed cottony wool. The latter, generally of a white or tawny colour, is uniformly spread over the leaf-stalks, flower-stalks, ovary, and the under surface of the leaves, also extending to the upper surface, along the mid-rib, and to the very base in a less degree. The leaves are confined to the ends of the branches, 3½ to 5 inches long, by about 2 inches broad, obovate or elliptical, obtuse, the colour a full yellowish green. Leaf-stalks short, thick, very woolly. Heads terminal, of 6 to 10 rather large, inclined flowers. Flower-stalks 1½ inch long, thickened. Corolla ochroleucous or pale sulphur-colour : the tube broad-campanulate (like that of R. *Wightii*) ; within, above, and 3 of the upper lobes in part sprinkled with red dots ; limb 2 to 3½ inches across, of 5 nearly equal, very spreading, rounded, entire, obtuse lobes. In the dense wool on the under side of the leaves, this species may be compared with R. *fulgens* and R. *æruginosum* among the large shrubby kinds, and with R. *Edgeworthii* and R. *pendulum* among others.

19. R. *campylocarpum* —Distribution and range : *East Nepal* and *Sikkim*—11,000 to 14,000 feet—common in alpine valleys.

A small bush, averaging 6 feet in height, rounded in form, of a bright green hue, and which, when covered with its delicate inflorescence, claims precedence over its more gaudy congeners, and has always been regarded by me as the most elegant of the Sikkim Rhododendrons. The flowers have a pleasant honeyed scent, and a resinous, sweet odour is exhaled from the stalked glands of the leaf and flower stalks, calyx, and capsules. Leaves on slender stalks, ¾ of an inch long, coriaceous but not thick in texture, 2 to 3½ inches long, 1¾ to 2 inches broad ; in all characters, except the evanescent glandular hairs and spherical buds, undistinguishable from those of R. *Thomsoni*. Flowers horizontal and nodding. Corolla campanulate, delicate in texture, tinged of a sulphur hue and always spotless, nearly 2 inches long, broader across the lobes, which are finely veined. The stalks of the capsules radiate horizontally from the ends of the branchlets, and the capsules themselves curve upwards in a semicircular arc ; they are about an inch long, always loosely covered with stalked glands.

20. *R. cinnabarinum.*—Distribution and range: *East Nepal, Sikkim,* and *Bhotan*—10,000 to 12,000 feet—in valleys and on the tops of mountains in very damp regions.

Under this species I include R. *Roylei* of the 'Sikkim Rhododendrons.' Neither of the figures give a good idea of the plant, which forms a rather elegant bush, about 8 feet high, conspicuous in May and June from its elegant blossoms, which form very loose and graceful heads of long pendulous flowers. The figures of R. *cinnabarinum* and R. *Roylei* are from stunted specimens growing in very exposed situations; the leaves are not usually reticulated except under these circumstances, and are rather membranous, of a glaucous green below and rather bluish above. Flowers, 4 to 6 in a head, 1½ inch long, with a narrow, funnel-shaped tube, and slightly spreading broad lobes, which are sometimes rather sharp at the point. It is universally considered poisonous to cattle and goats: of the latter I have seen many die from eating either of this or of a species of *Andromeda,* which latter is notorious for this property throughout Sikkim, Nepal, and N.W. Himalaya. If employed as fuel, the smoke causes the eyes to inflame and the cheeks to swell.

21. R. *glaucum.*—Distribution and range: *Sikkim* and *Bhotan,* in moist rocky places.—10,000 to 12,000 feet.

This constitutes a small shrub of the average height of 2 feet. Branches scarcely so thick as a goose-quill, yellowish-brown, often glaucous-white, the younger ones scaly. Leaves rather crowded at the extremities of the branches, 1 to 3 inches long, usually 1 to 1½ inch broad, on short stalks, upper side deep green, when old naked above, below remarkably glaucous, almost white, and quite dotted with copious little scales, which in the young state cover the whole leaf, and at all times abound on the bracteas, bud, flower-stalks, and especially on the sepals. Flower-stalks 7 to 8, almost in an umbel at the ends of the branches, erect, an inch or more long, rather slender. Flowers erect or inclined, pale pinkish-purple. Corolla rather more than an inch long, and about as broad in the widest part, tube campanulate, limb moderately spreading, of 5 nearly equal rounded notched lobes. The remarkable glaucous colour of the underside of the leaves, and the great development of the calyx, readily distinguish this species. In foliage it closely resembles R. *virgatum,* but the inflorescence and calyx are widely different. The whole plant has a powerful resinous smell, due to exceedingly small globules of a pale yellow colour which exude from beneath the little scales on the under side of the leaves. These scales are very curious; the majority are smaller, pale-coloured, exhibiting several concentric circles of small, nearly uniform, cells; the larger are bristly at the margin, and consist of a centre or disc of small cells surrounded by a limb or margin of radiating elongated ones.

22. R. *pumilum*.—Distribution and range: *Sikkim*.—Alpine slopes. 12,000 to 14,000 feet.

The smallest of all the Sikkim Rhododendrons. Its slender woody stem roots among moss, *Andromeda fastiagiata*, &c., ascends obliquely, and bears a few spreading branches, 3 to 4 inches in length, rising above the surrounding vegetation. Leaves, chiefly from the upper ends of the branches, ½ to ¾ of an inch long, bright bluish-green above, below scaly, as is the short stalk, and glaucous. Flower-stalks moderately slender, erect, 1 to 3 on the ends of the branches, and rising 1⅓ inch above the base of the superior leaves, firm and woody, much elongated, and straight to the very top when in fruit. Flowers inclined or almost drooping. Corolla ⅓ to ½ of an inch long, rose-colour, campanulate, very delicate, externally downy, and obscurely glandular; the tube rather broad, the limb of 5 nearly equal, moderately spreading, roundish entire lobes. An extremely elegant species, and apparently very rare; for I have only gathered it twice, and each time in the wildest districts of Sikkim, where its elegant flowers appear soon after the snow has melted, when its pretty pink bells are seen peeping above the surrounding short heath-like vegetation, reminding the botanist of those of *Linnæa borealis*. It has a faint and agreeable odour like that of R. *glaucum*, to which it has many points of resemblance

23. R. *camelliaflorum*.—Distribution and range: *East Nepal, Sikkim*, and *Bhotan*.—In moist fir woods.—9,000 to 12,000 feet.

This very curious species is more allied, in some respects, to the section including R. *lepidotum* than to any of the others; in foliage it resembles R. *Maddeni*, though much smaller; and also R. *cinnabarinum*, from which the dried flowerless specimens are not easily distinguishable. The same very stout mid-rib, which runs through and forms the point of the leaf, is common to all these. Stems 2 to 6 feet long, seldom thicker than a goose-quill; branches long, generally pendulous, though when growing on cliffs often obscurely so. Leaves, as usual in the geuns, at the ends of the branches, differing in little but size from those of R. *Maddeni*, 2½ to 3 inches long. Flower-stalks axillary or terminal, very short and stout. Corolla sparingly scaly, 1½ inch across, of a very thick texture, pure white with a faint rosy tinge, all the segments obtuse and entire. The similarity between the flower and that of a single (wild) *Camellia* has suggested the trivial name. Odour, as in all the scaly species, more or less strongly resinous according to the heat of the day.

24. R. *pendulum*.—Distribution and range; *Sikkim*.—9,000 to 11,000 feet.—In humid forests.

Stems 3 to 4 feet long, sparingly branched, branches scarcely stouter than a crow's quill. Leaves chiefly confined to the ends of the branchlets, on short stalks, *spreading, smooth and shining above, the margins a little recurved, 1½ to 2 inches long and about ¾ of an inch broad, below densely clothed* with *ferruginous* wool. Flower-stalks 2 to 3 from the ends of the young leafy branches, very short, but longer than the leaf-stalks, ferruginously shaggy, bearing 1 or 2 linear bracteas. Flowers small. Corolla pure white, about an inch in diameter, externally scaly, tube very short, gradually expanding into the nearly equally 5-lobed limb : lobes rounded, waved at the margin, entire. This species is inodorous, very distinct, although allied to R. *camelliæflorum*, the scaly character of that species here giving place to a dense fulvous or ferruginous wool. Growing, as it does, an epiphyte, upon the trunks of trees in the gloomy and impenetrable forests, it is difficult to find.

III. Species of the Upper or Arctic Zone from 14,000 to 18,000 feet, answering to the Arctic latitude beyond the wooded regions, the islands of the Polar Seas, Iceland, Spitzbergen, &c.

25. R. *lepidotum.*—Distribution and range : *Rocky mountains and valleys in Nepal, Sikkim,* and *Bhotan.*—8,000 to 16,000 feet. R. *lepidotum elæagnoides, obovatum,* and *salignum*, of the "Sikkim Rhododendrons."

This curious and very variable species abounds at 14,000 to 15,000 feet, but also extends as low as 8,000 feet in moist valleys. It forms a slender or stout twiggy shrub, 1 to 4 feet high, branching from a stout tortuous stock ; the branches as thick as a crow-quill, rather scattered, bearing tufts of branchlets at the top. It often grows in widely-extended clumps, much as heather does, but never so extensively ; and emits, in sunshine, a powerful resinous odour. Leaves of a pale glaucous green, lighter underneath, and sometimes ferruginous where the scales abound ; ½ to 1½ inch long. Flower-stalks more or less elongated, 1½ to 2 inches long, slender. Corolla yellow or dirty purple, ½ an inch across the lobes ; scaly, especially on the outside of the tube ; the upper lobes are spotted with green.—The odour of this plant is strongly resinous, and rather sweetish and pleasant. Its common name is "Tsaluma," or "Tsuma," amongst the Bhoteas. The description in De Candolle (Prodr., vol. vii., p. 724), if, as I do not doubt, it refers to this plant, is very erroneous. The leaves cannot be called "ferruginous below," in the same sense as applied to R. *anthopogon*, &c., nor are there any bristles or hairs at the bases of the leaves ; nor have I observed more than 8 stamens, the typical number in this very distinct group.

26. R. *anthopogon.*—Distribution and range : *Kemaon, Nepal,* and *Sikkim*—12,000 to 16,000 feet—abundant, especially in the drier climates.

This interesting species has been figured from plants introduced by Dr. Wallich, which flowered in England. It is a strongly and far more disagreeably scented plant than R. *setosum*. This, the *Palu* of the Bhoteas, shares with the *Tsallu* (R. *setosum*) the blame of exciting the dreaded headache and nausea attending ascents to the elevations of the Eastern Himalaya. In the Herbarium its permanent odour is more disagreeable than that of any of the genus. Its flowers are extremely beautiful, both from the membranaceous, translucent texture of the delicately nerved corolla, and from the varied tints of the blosoms, which on first opening are of a rich blush-colour, insensibly passing into pure white, and finally becoming faintly tinged with sulphur.

27. R. *setosum*.—Distribution and range: *Kemaon*, *Nepal*, and *Sikkim*—13,000 to 16,000 feet—most abundant in the drier valleys of the interior.

Stems from 8 to 12 inches high, much branched, branches covered with a papery bark. Leaves small, copious towards the ends of the branches, ⅓ to ½ an inch long, coriaceous, dark green above, pale and glaucous beneath, hairy on the recurved margin. Flower-stalks ½ to 1 inch long, 3 to 5 from the ends of the numerous branches, erect. Corolla bright red rose-colour, 1½ inch across, 5-partite, the tube very short; the lobes spreading, oblong, waved at the margin.—A small and elegant shrub, resembling *Rhodora*, especially in the flowers, except that these are more abundant and brighter coloured; and the foliage is box-like and evergreen. It is the *Tsallu* of the Sikkim Bhoteas and Tibetans, who attribute the oppression and headaches attending the crossing of the loftiest passes of Eastern Himalaya to the strongly resinous odour of this and of R. *anthopogon*, Wall. (*Palu* of the natives). The species certainly abounds near the summits of all the passes, and after hot sunshine fill the atmosphere with its powerful aroma, far too heavy to be agreeable, and greatly aggravating the discomforts of toiling in the rarefied medium of these elevations. In its late flowering (June and July) and early fruiting (October) it is well adapted to the brief and distinctly circumscribed summer of these regions; whilst its powerful odour and copious resinous secretions equally indicate a drier climate than is enjoyed by most of its congeners The hand, on being passed over the foliage and branches, becomes covered with the clammy exudation, of which it long retains the scent. A useful volatile oil, of no less marked a character than that of the American *Gaultheria* (now in great demand by the perfumers), might probably be obtained from the foliage by distillation.

28. R. *nivale*.—Distribution and range: *Sikkim Himmalaya*—in the dry valleys of the interior—at elevations of 16,000 to 18,000 feet.

The hard woody branches of this curious little species, as thick as a goose-quill, straggle along the ground for a foot or two, presenting brown tufts of vegetation where few other plants can exist. The branches are densely interwoven, and wholly depressed, being raised barely 2 inches above the soil. The surface of the branchlets and foliage is covered by small scales of a rather bright ferruginous-brown. Leaves $\frac{1}{6}$ to $\frac{1}{8}$ of an inch long, pale green. Corolla $\frac{1}{3}$ of an inch across the lobes, of a purple colour. The whole plant is very odoriferous. It appears indifferent to the changes of climate, remaining buried under many feet of snow for eight months of the year; whilst at other periods the soil around it is heated to 150°. In the most genial weather snow-storms are of frequent occurrence; they do not however, injure its blossoms, which remain open until fertilization has taken place. This species attains, I believe, a loftier elevation than any other shrub in the world. Its nearest allies are R. *setosum* and R. *Lapponicum*, from which latter it differs in its smaller stature and solitary sessile flowers.

(To be Continued.)

On the Respiration of Plants.

The idea generally entertained of the respiration of plants is, that it is a process by which carbonic acid is decomposed, and oxygen evolved in a free condition, as a gas, into the atmosphere, this operation going on most actively under the direct influence of the sun's rays. But it has long been known that there exists also in vegetable life a process by which carbonic acid is set free, as it is in the respiration of animals, and this process, observed most distinctly in plants removed from the sun's light, is one respecting which much obscurity still prevails. In drawing especial attention to this process as occurring so generally in plants or parts of plants devoid of chlorophyll, I remarked,* some years ago, that from its evidently general occurrence it must be a true vital process, and not merely a result of a destructive or decomposing action of oxygen upon the vegetable tissues and their contents.

Some very interesting experiments have been recently published by M. Garreau, of Lille, which throw much light upon the conditions of this exhalation of carbonic acid from living plants. He finds that it takes place not only in the absence of the sun's light but in the full sunlight, and simultaneously with the evolution of oxygen, the much greater quantity of the latter, together with the process of re-absorption of the evolved carbonic acid under such circumstances having disguised this fact in the experiments of most previous observers.

M. Garreau placed branches, and other portions of living vegetable structures, under conditions in which he could fix any carbonic acid set free (by means of solution of caustic baryta), and thus remove it completely from the liability to be re-absorbed by the green parts of the plants under the influence of sun-light, and the result of numerous trials, was to show that leaves exhale carbonic acid during the day, both in the sun and in the shade, and that the quantity increases in proportion to the temperature in which the plant is kept.

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* Outlines of Structural and Physiological, Botany § 207.

To show the simultaneous occurrence of the two phenomena, one branch of a living plant of *Fagopyrum cymosum* was introduced into a glass flask securely closed, and connected with a caoutchouc bag containing 200 cubic centimetres of carbonic acid. After six hours exposure to the sun-light only, 75 centimetres of gas remained, the rest had been absorbed by the plant. At the same time another branch of the same plant, of equal size, was introduced into a closed flask provided with a quantity of solution of baryta, to *absorb any carbonic acid given off, and at the end of the six hours the baryta had absorbed eleven centimetres of carbonic acid. Other experiments showed that this carbonic acid is given off in greatest abundance by germinating seeds, next in proportion by buds, and least by the leaves; and that the amount of carbonic acid is given off most abundantly, weight and surface being equal, from organs which contain the greatest quantity of the nitrogenous cell-contents.*

This last fact is of great interest, since it seems to connect this process of evolution of carbonic acid most closely with the respiration of animals, for it is well-known that the nitrogenous or proteinous cell-contents, the *protoplasm* of Mohl, or *endochrome* of some authors, is the real living part of the cell, the cell-wall composed of cellulose being rather a kind of shell or case. For we see that all the phenomena of development depend upon it, and moreover, what is still more striking, it is this matter that exhibits all those phenomena of locomotion which have been observed in plants, namely, the circulation of the cell-sap, as it is called, in *Vallisneria*, *Chara*, the hairs of *Tradescantia*, &c., and in the zoospores, or moving reproductive bodies of the Algæ, which are composed entirely of nitrogenous matter, when moving freely in the water, and only acquire a cellulose coat afterwards.

From these and similar considerations, M. Garreau proposes to restrict the name of respiration to that process in which carbon is consumed, and carbonic acid given off, as in animals, and to place the other process, in which carbon is fixed and oxygen given off, among the nutritive processes. This would indeed appear to be the most philosophical way of arranging these phenomena of vegetation, but at the same time we are still so imperfectly acquainted with the import of these processes, and the details of their operation, that it would perhaps be wise to leave our terminology untouched until the analogies and differences of the nutritive operations in plants and animals have been more completely elucidated.

The experiments of M. Garreau are published in the "Annales des Sciences Naturelles" for 1851, in Vol. XV., No. 1, and Vol. XVI., No. 5.—ARTHUR HENFREY, F.R.S., &c.—(*The Garden Companion, July* 1852.)

Monthly Proceedings of the Society.

(Saturday, the 10th January, 1852.)

Anniversary Meeting and Ordinary General Meeting.

Lieutenant-Colonel Wm. Sage, Vice-President, in the chair.

Read a letter from the President, intimating his inability to attend the meeting, in consequence of official business obliging him to remain till a late hour in Court.

The Proceedings of the last General Meeting were read and confirmed.

Election of Officers and Council for 1852.

The Chairman intimated that this being the Anniversary Meeting, the members present would have to elect Officers and Council for the ensuing year, in accordance with Sections 1, 2 and 3 of Ch. X. of the Bye-laws. The meeting accordingly proceeded to the ballot, and Messrs. Geo. Taylor and C. Cantor, who had been appointed scrutineers, reported the result to be as follows :—

President.—The Hon'ble Sir Lawrence Peel.

Vice-Presidents.—Mr. W. G. Rose, Lieutenant-Colonel W. Sage, Baboo Ramgopal Ghose and Baboo Horeemohun Sen.

Secretary and Treasurer.—Mr. A. H. Blechynden.

Council.—Sir Arthur Buller, Mr. W. Storm, Mr. James Church, Senior, Mr. A. Grote, Baboo Peary Chand Mittra, Dr. H. Falconer, Mr. A. T. Peterson, Rajah Pertapchunder Sing, Mr. H. Alexander, Mr. W. Earle, Mr. W. H. Elliot, and Mr. W. Haworth.

Standing Committees.

The revision of the various standing committees was next taken into consideration. On the recommendation of the Council, the name of Mr. W. Hammill was added to the Sugar Committee in the room of Mr. Afred Turner, who is absent ; and of Mr. A. Grote to the Floricultural Committee, in the place of Captain Staples, who is also absent. On the proposal of Baboo Ramgopal Ghose, Mr. W. Haworth's name was added to the Sugar Committee. It being the opinion of the meeting that the other Committees did not require strengthening, they remain as last year.

Annual Report from the Council.

A summary of the principal objects which have engaged the attention of the Society during the past year, was submitted by the Chairman, on behalf of the Council. The report states, among other topics, that the funds of the Society are in a satisfactory condition ; that after payment of the ordinary current expenditure for 1851, there remains the sum of about Rs 8,500, as outstandings, inclusive of a cash balance of Rs. 1,122, to meet liabilities to the extent of Rs. 4,124. The vested fund is the same as at the close of 1850, viz. Rs. 22,366. The accession of members during the past year has been 122, which is greater than any previous year, except 1837, since the formation of the Society : and the number of *paying* members is now 495 (exclusive of 37 who have compounded for their subscription) or 79 in excess of 1850.

Resolved, that the Report of the Council be adopted.

Elections.

Messrs. T. Kenny, J. P. Thomas, Justin Finch, Rajah Jye Mungul Sing, Messr. P. Durand, Geo. Pauling, A. D'Cruz, Junior, and the Hon'ble C. R. M. Jackson.

Candidates for Election.

P. Crump, Esq., of Munjhout factory, Monghyr,—proposed by Mr. John Bean, seconded by the Secretary

The Hon'ble R. Drummond, C. S ,—proposed by Col. E. Garstin, seconded by Lieut.-Col. W. Sage.

G. T. Cleeve, Esq., Berhampore,—proposed by Mr. W. G. Rose, seconded by Mr. W. Storm.

H. D. Tripp, Esq., of Salgamudea factory, Pubna,—proposed by Mr. H. Brae, seconded by Mr. G. McNair.

G. Malchus, Esq., Calcutta,—proposed by Mr. Rose, seconded by Mr. C. J. Sutherland.

Capt E. Fleetwood Smith, 2nd in command Assam Light Infantry,—proposed by Capt. H. Vetch, seconded by Lieut -Col. F. Jenkins.

Baboo Nobokoomar Mullick, Calcutta,—proposed by the Secretary, second by Baboo Peary Chand Mittra.

Lieut.-Col. James Fitzgerald, (42nd M. N. I.) Jubbulpore,—proposed by Mr. C. A. Cantor, seconded by Mr. Geo. Taylor.

Baboo Govin Chunder Dutt, Actuary Government Savings Bank,—proposed by Mr. Hugh Fraser, seconded by the Secretary.

Motions.

The Motion No. 1, of which notice was given by Mr. Willis Earle, at the last General Meeting, was brought forward, seconded by Mr. J. Sinclair, viz. —" That the six resolutions, regarding the free distribution of plants from the Hon'ble Company's Botanic Garden, passed at the Meeting of the 13th June last, be rescinded."

For the motion, 6 and Mofussil votes 12=18
Against it, 21 „ „ „ 4=25

Lost by a Majority of .. 7

Mr. Earle then proposed, seconded by Mr. Hugh Fraser, that certain votes from Mofussil members to the number of 21, which had been laid before the last Meeting for the rescission of the above mentioned six resolutions, whenever a motion to that effect were brought forward, should now be received.

The Chairman stated that these votes were inadmissible. They were sent in to the Secretary for record before Mr. Earle had given notice of his motion, and could not therefore be received consistently with section 8 of Ch. XI. of the Bye-laws, which provides that "Mofussil members shall have the privilege of voting on questions of which one month's notice is given."

The great majority of the Meeting coinciding in the opinion of the Chairman, the votes in question were not received.

The motion No. 2, of which notice was given by Mr. W. G. Rose, at the last General Meeting, was next submitted, being seconded by Mr. R. Molloy :—

"That this Society respectfully submit to the Government of India that it would tend to promote Horticulture, if the Honorable the E. I. Company were to cease distributing plants gratuitously from their garden to persons resident in India, after three years' notice being previously given to that effect."

For the motion 28, and Mofussil votes 30=58
Against it, 5, and „ „ 6=11

Carried by a majority of .. 47

Presentations.

1.—Selections (No. 5) from the Records of the Government of Bengal. Papers by Dr. Campbell and Major Jenkins on the Sikhim Morung, and on Kooch Behar. *Presented by Government.*

2.—Madras Journal of Literature and Science, July to December, 1850, No. 38.—Vol. XVI. *Presented by the Madras Literary Society.*

3.—Journal of the Indian Archipelago for October, 1851. *Presented by the Editor.*

4.—A copy of the same work for the same period. *Presented by the Government of Bengal.*

5.—Specimen *Faunæ Subterraneæ*. *Presented by Dr. N. Wallich.*

6.—Six plants of the Madras Pumplenose. *Presented by A. Emerson, Esq.*

7.—A small box of vegetable seeds from China. *Presented by Dr. Macgowan.*

8.—A quantity of bulbs of a species of *Crinum*, and of tubers of a terrestrial Orchid (*Cyrtopera flava*). *Presented by Melmoth Hall, Esq.*

Mr. Hall states that he has collected the above from the forests of the Gorruckpore district. The following is extract from his note :—

"The bulbs are called by the natives tal or benkandrá. I believe it to be a kind of squill : it is used by natives as a sinapism or poultice : it bears a very pretty delicate white flower, and is very sweet. The tubers are called "gaophatti." The former requires a rich stiff soil, should be kept dry from October to May ; and, from June to September should be supplied with water freely ; indeed it blossoms very well under water, though not so well as I have found them in my own garden. The latter must be planted in *a very rich* light sandy soil, not above one inch below the surface ; dung does not suit them, however old ; but leaf mould (in my factory, old *sit*, or *juthi*) does excellently : keep dry till May ; then water freely—copiously—till end of July ; it flowers best in a somewhat shady situation. The colour of the spike of flowers is a rich golden yellow, dashed inside, after the manner of the *Digitalis*, with light spots ; the fragrance is exquisite ; the leaf a long spear-shaped corrigated one ; it is highly ornamental."

The Gardener's Monthly Report was submitted.

Mr. McMurray states he has been successful in raising plants from Carter's stock of fruit seeds and stones ; also from the stock of seeds indigenous to the Cape received in November last ; and likewise from Captain Blagrave's valuable collection of seeds from the Punjaub. The packet of flower seeds from Mr. Landreth of Philadelphia, have germinated very partially, only 35 out of 102 kinds.

The Gardener adds that he has a quantity of tubers of the Jerusalem artichoke ready for distribution to members desirous of small supplies.

The Report of the Committee appointed at the last Meeting to determine respecting the provision of vegetable and flower seeds for 1852, was laid on the table. The Committee suggest that supplies of vegetable seeds be procured from the Cape of Good Hope and from Edinburgh, and a large collection of flower seeds from Mr. Carter of London, at a total cost, including the order previously given to Mr. Landreth of Philadelphia, of Rs. 9,000, exclusive of freight and other incidental charges, or Rs. 870½ more than the indent of last year. The report, which was recommended by the Council for adoption, was confirmed.

The joint Report of the Floricultural Committee and Fruit and Kitchen Garden Committee respecting the arrangements for the shows of the season, was also submitted. The Committees recommend that three shows be held in the Auckland Circus during the season—namely, on the 27th January, 6th March and 10th April, all which days are public holidays.

It was also resolved that the Anniversary Dinner be held on the first show-day, Tuesday, the 27th January, and that Messrs. Rose, Church and Peterson form the Committee to make the necessary arrangements.

Read a letter from H. Mornay, Esq., suggesting the appointment of a practical Engineer to arrange the machinery that will be sent in to compete for the prize of Rs. 5,000 offered by the Government of India for the best cotton cleaning machine.

Read the minutes of the Machinery Committee, to whom the above letter had been referred, approving of the suggestion.

Read the resolution of the Council on the same subject.

Resolved, that the services of an engineer be engaged, and that the remuneration for his labor be determined on by the Machinery Committee.

Read the following extract of a letter from T. Tonnochy, Esq. :—

"I have long had it in contemplation to address the Society, with regard to the tobacco of which cheroots and cigars, going under the names of Havannah and Manilla, are made. It appears to me that the tobacco is some way or other sophisticated to impart to them the particular flavor that attaches to them, and to which the public taste has now become inveterately accustomed ; and I am decidedly of opinion that no pure tobacco can possess the strength or taste that Havannahs and Manillas do, and in a far greater degree the long cheroots manufactured at some French settlement on the Coast (Trichinopoly it strikes me is the name of the place). The cheroots from these several places not only differ in pungency from each other, but even amongst the separate parcels from the same place, nay even in the contents of each individual box. These differences can therefore only be owing to the elaboration in the sophistication to which several batches of tobacco were subjected ; and as cheroots form an article of such general and extensive consumption, and as they bear so disproportionate a value compared with the comparatively trifling cost at which the tobacco is sold by the agriculturist, that it appears to me to be completely within the province of the Agricultural Society to find out the secret of their manufacture, and that it should spare no trouble and expense in the attainment of so desirable an end."

Read the minutes of the Tobacco Committee, to whom the above letter had been referred, suggesting that communications be addressed to certain parties on the subject.

Resolved, that the Secretary address them accordingly.

Submitted an application from the Gardener, for the services of a writer, to enable him to devote the whole of his time, which is now encroached on, to the out-door department of his work.

Read a memorandum from the Garden Committee supporting the above application, and suggesting the appointment of a writer at 14 Rs. per mensem, for six months, experimentally.

The above having been also recommended by the Council,—*Resolved*, that the expense be incurred.

(Saturday, the 14th February, 1852.)

The Hon'ble Sir Lawrence Peel, President, in the chair.

The proceedings of the last General Meeting were read and confirmed.

Elections.

The Hon'ble R. Drummond, C. S., Messrs. P. Crump, G. T. Cleeve, H. D. Tripp and G. Malchus; Captain E. Fleetwood Smith, Baboo Nobokoomar Mullick, Lieut.-Col. James Fitz Gerald, and Baboo Govin Chunder Dutt.

Candidates for Election.

Daniel Cameron, Esq., of Rajmahal,—proposed by Baboo Peary Chand Mittra, seconded by the Secretary.

Captain Henry Blake, (36th Madras N. I.), Deputy Judge Advocate, Northern Division,—proposed by Captain W. Owen, seconded by the Secretary.

L. S. Jackson Esq., C. S.,—proposed by Mr. G. G. Balfour, seconded by the Secretary.

As an Honorary Member.

Lt.-Col. Francis Jenkins, Commissioner of Assam, proposed by Lt.-Col. Wm. Sage, seconded by Mr. Cantor, (on the recommendation of the Council) in acknowledgment of his long, unremitting and valuable services in the cause of Agriculture and Horticulture.

Tribute of Respect to the Memory of the late Lt.-Col. T. E. A. Napleton.

The Secretary submitted, on behalf of the Council, the following proposed tribute of respect to the memory of the late Lt.-Col. Napleton :—

"That this Society, on holding its first Meeting after the receipt of the intelligence of the lamented death of Lt.-Col. T. E. A. Napleton, the founder of the Branch Agricultural and Horticultural Societies of Bhaugulpore and Delhi, is desirous of putting on record its sense of the valuable services rendered by him to the cause of Agriculture and Horticulture in India, and of expressing its deep regret at the loss which that cause has sustained by the demise of so zealous and useful a member and correspondent."

Proposed by Col. Sage, seconded by Mr. Cantor and agreed to unanimously, that this Meeting adopts the above tribute of respect, and that a copy thereof be forward to Mrs. Napleton.

Read extract of a letter from Mr. Willis Earle, tendering his resignation as member of the Council. Mr. Earle intimates that he finds he cannot attend the Meetings of the Council so regularly as a member ought to do, chiefly on account of business, but occasionally also through indisposition.

Submitted a recommendation from the Council for disposal at the next General Meeting, in accordance with section 5 of Ch. X. of the Bye-Laws, that Mr. George Taylor fill the vacancy in the Council caused by the resignation of Mr. Earle.

Notice of Motions.

The following notice of motions for the next General Meeting, was given by Baboo Rajendralall Mittra :—

1st.—"That the Society devote a sum not exceeding 500 rupees for the preparation and publication of an elementary treatise on Botany in Bengalee for the use of the Society's Agricultural School and of native malees generally."

2nd.—"That the Translation Committee be requested to submit, through the Council, a plan as to the best way in which the object of the foregoing proposal may be carried out."

Horti-Floricultural Exhibition.

Read the following reports of the judges at the show of vegetables, fruits and flowers, held in the Auckland Circus, on the 5th of February :—

Horticultural.—"The judges have to observe that the result of the late Horticultural show was, on the whole, very satisfactory.

"As regards vegetables, they may remark that the potatoes were exceedingly well represented ; a silver medal, the only one given, was awarded to the owner of the best specimen. Of Cauliflowers there was an excellent display, fully equal, if not superior, to what is seen in the English market ; the brocoli is increasing in quantity and qaulity. Carrots, turnips, peas, beet and endive were well shewn. The celery, though tolerably good, was not considered as sufficiently up to the mark to warrant the award of a silver medal, which had been assigned for it. The squash was good, shewing it to be established. Artichokes were well represented, especially the globe kind, although long before their expected appearance. A fair collection of herbs was exhibited.

"In the fruit department, some baskets of very fair oranges were shewn, the produce of China and Sylhet stock ; the former deserves to be particularly noticed, it being a thin-skinned and new kind in this part. The pomegranates and sapotas were good, so was the bêl ; the pine-apples and pummeloes were fairly shewn, more especially the latter, though this is not the season for either ; there were also some specimens of loquots and custard apples, both out of season. A few specimens of a fruit, in a green state, were likewise exhibited by the owner as a kind of 'mangosteen;' but a reference to Dr. Falconer proves it to be the 'sapote negro,' or black sapota, '*Diospyros sapota,' one of the gaub tribe; 'Padre Blanco,'* adds *Dr. Falconer,—' says it is indigenous to the Phillipines. The fruit in the Botanic Garden is much larger than the specimen sent for my inspection. The tree has been grown here for upwards of 40 years.'*

"The competition was great. About 200 gardeners were in attendance, their produce occupying two-thirds of the space allotted, viz 1,500 feet; the other third, or 750 feet, being occupied by flowers. In addition to the silver medal already referred to, prizes in money, amounting to Rs. 294, were awarded to 54 other mallees for the specimens detailed in the annexed list.

(Signed) W. G Rose.
G. T. F. Speede.
Peary Chand Mittra."

Floricultural.—"The Judges have to report that, though several well-grown plants were brought forward, and a few novelties exhibited, the show was, altogether, an indifferent one, it being too early in the season for the majority of annuals, for several of the bulbous and orchid tribes, and too late for some other descriptions, such as dahlias, chrysanthemums, &c. Among the novelties were a few kinds, tolerably well-grown, of Cupheas; some plants of a red flowered Camellia; a Jonquil; a few Hyacinths; some plants of Lachenalia tricolor (a Cape bulb), Sanvitalia procumbens, double daisies, and Chelone barbata. In the list of well-grown plants may be mentioned about one hundred specimens of pelargoniums, consisting of 11 sorts raised in the Auckland Garden, and 15 sorts from the garden of Mr. H. Wood. The Mimulus and Martynias were an improvement on the plants exhibited at the first show of 1851: there were also several plants, in fine flower, of Euphorbia Jacquiniflora, though not equal to last year's display. Some fine roses were shewn; and of heartsease the collection was very creditable.

"The competition was tolerably spirited, greater than that of last year; the produce of from 36 to 40 gardens being represented, to 30 of which prizes to the amount of Rupees 188 were awarded, as per detailed list herewith annexed.

(Signed) W. Sage.
A. Grote.
W. H. Elliott."

Nursery Garden.

The Gardener's Monthly Report was submitted. Mr. McMurray notifies for the information of members, or others who may at present be in want of fruit trees, that he has now 700 mangoe grafts, of fourteen kinds, and 200 peach grafts, of eight kinds, ready for distribution, at the fixed scale of charges. Further, that there are also one thousand rose plants of sorts ready for issue to members. The plants raised from the assortment of seeds indigenous to the Cape of Good Hope, recently purchased by the Society, may also be made available to members, there being a superabundance of many of the kinds in store at present; likewise of tea plants raised from seed presented by Dr. Jameson in November last, which have germinated freely.

The Gardener refers to several late contributions to the Nursery, including Mr. Emerson's donation, in January last, of twenty-six healthy plants from China and Madras, such as litchees, wampees, peaches, loquots, pumplenose, magnolias, roses, &c. He adds that the eight camellia plants presented by the same gentleman in September last, and which were set out in the open ground on the 29th of the same month, continue in a healthy condition, and two of them are now in flower.

On the Introduction of the Quinine-yielding Cinchonas into India.

Read the following extract of a letter from Major C. O'Brien, President of the Simla Horticultural Society :—"It has been suggested some time ago that the *Cinchona* tree might be introduced with a chance of success into these hills. The Simla Garden is at an elevation above the sea of about 6,500 feet. Could you give me any information regarding this tree, and whether there would be much difficulty in procuring small trees, or the seeds of the *Cinchona*?"

The Secretary stated that the above extract had been referred by the Council to Dr. Falconer, for information, who had obligingly responded to it most fully, by furnishing an interesting paper on the subject.

Resolved,—That a copy of the above paper be forwarded to Government with the respectful request of the Society that it will be pleased to give it the consideration which the importance of the subject deserves.

Dr. Falconer having brought to the notice of the meeting,—now that a communication had been established between Demerara and Calcutta, through the return coolee ships,—the advantage that would probably result were the Society to direct its attention to the subject of the introduction of the useful plants of Guiana and Brazil into this country,—it was *resolved*, that the matter be referred to the Council for consideration, and that Dr. Falconer be requested to draw up a list of *desiderata* for their information.

Communications on various subjects.

The following letters were also submitted :—

1. From Messrs. Ritchie, Stuart and Co., of Bombay, advising the despatch on behalf of Mr. Frost, of Dharwar, of a saw gin, to compete for the prize of Rs. 5,000.

2. From Messrs. Bates, Hyde and Co., of Massachusetts, (United States of America,) intimating that they had forwarded a saw gin to compete for the above prize.

3. From H. Mornay, Esq., submitting a *churka* or roller gin, with the *same object in view.*

4. From W. Seton-Karr, Esq., Under-Secretary Government of Bengal, intimating that, in accordance with the request of the Society, an application had been made to the Governments of Bombay and Madras, and to the Commissioner of Assam, for the seed cotton required to test the machines that may be submitted to compete for the prize.

5. From George Loch, Esq., Secretary Branch Agricultural and Horticultural Society of Bhaugulpore, requesting the aid of the Parent Society for obtaining consignments of vegetable and flower seeds from England, America, and the Cape.

6. From Major C. O'Brien, President Simla Horticultural Society, a request to the same effect.

Resolved.—On the recommendation of the Council, that these requests be complied with, funds being placed at the disposal of the Society to meet the estimated cost.

7. From G. H. Thwaites, Esq., Superintendent Royal Botanic Garden, Ceylon, forwarding a small supply of Shiraz tobacco seed.

8. From Hugh Fraser, Esq., intimating his withdrawal from the Society.

A plant, in good flower, of *Cypripedium venustum*, or the ladies' slipper, from the garden of Mrs. Mcleod, and a small tulip in flower from the garden of Mr. Dove, were placed on the table.

(*Saturday, the 13th of March*, 1852.)

W. G. Rose, Esq., Vice-President, in the Chair.

The proceedings of the last General Meeting were read and confirmed.

Elections.

As an Honorary Member. Lieut.-Col. Francis Jenkins, Commissioner of Assam.

As Ordinary Members. Daniel Cameron, Esq.; Captain Henry Blake; and L. S. Jackson, Esq., C. S.

Candidates for Election.

John Hayton, Esq., of Trehmonee, Jessore,—proposed by Dr. Charles Palmer, seconded by Mr. James Church, Senior.

D. McDonald, Esq., merchant, Calcutta,—proposed by Mr. C. A. Cantor, seconded by Mr. W. Storm.

Anandram Dhekial Phookun, of Assam,—proposed by Mr. C. A. Cantor, seconded by Baboo Peary Chand Mittra.

J. A. Loch, Esq., C. S., Bijnour,—proposed by the Secretary, seconded by Mr. Cantor.

Floricultural Exhibition.

Read the following report of the Judges respecting the last flower show :—

"In submitting a list of the prizes awarded at the flower show held in the Town Hall on the 6th of March, the Judges beg to offer a few remarks.

"The display of orchids was excellent,—although the number of species was not very great,—shewing a decided improvement in quantity on the March exhibition of last year; most of the specimens being of indigenous kinds. The assortment of bulbous and tuberous plants was tolerably fair, including several well-grown specimens of ranunculus, anemones and ixias. Among the verbenas two or three new varieties were submitted. There was a large collection of phloxes,—but no new kinds. Several fair specimens of sweet william were shewn, and a large assortment of pinks; also of heartsease, with several well formed flowers. The german asters, though few in number, were better represented than on any previous occasion. The collections of antirrhinum and petunias were good. There was also a tolerably large display of annuals, which have now become pretty common, such as eutocas, nemophilas, portulacas, schizanthus, lobelias, clarkias, brachycomes, &c. The fuchsias were not deemed worthy of prize notice, and the cupheas were not equal to those at the last show.

"Among the novelties were two well-grown plants of franciscea latifolia, another of cyrtoceras reflexum, and a cut specimen of roupellia grata, (the cream fruit plant of Sierra Leone) all from the garden of Sir Lawrence Peel. Fine examples of phaius grandiflorus and of an anthericum, and a cut specimen of strelitzia reginæ, from Rajah Nursing Chunder Roy's garden: babianas and ixias from Mr. B. Warwick's garden; also plants of echium and geum from the garden of Mr. W. Earle.

"The produce of about 45 gardens was submitted, and prizes awarded to 18.

"The Judges regret that necessity compelled the Society to revert to the Town Hall for holding the exhibition. They consider that building to be ill adapted for the purpose from the want of space and defective light, and that measures ought to be taken for providing the Society with suitable accommodation for the shows, not liable to contingencies like those of the present season.

(Signed) H. Falconer.
Wm. Sage.
W. H. Elliott.
A. Grote."

In connection with the above, the Secretary submitted a recommendation from the Council, that as the next show, fixed for the 10th of April, must also be held in the Town Hall, that it be confined to flowers; and that a show of vegetables and fruits be held at the end of May, that being a better season for them, than the early part of April.

Agreed,—and that it be left to the Fruit and Kitchen Garden Committee to fix the day.

Nursery Garden.

Read the following memoranda from the Garden Committee of visits paid to the Garden on the 27th February and 2d of March :—

"*Orchard.*—Inspected the Orchard and found all the fruit trees in a most healthy condition. Several of the mango and litchee trees are in blossom for the first time, and likely to yield a good stock of fruit, as also the peaches and pumplenose. Agreed, that the fruit trees received from the Bombay Agricultural and Horticultural Society, from Mr. Emerson, and from other quarters, be planted out, without further delay, in the localities suggested by the gardener. Mr. McMurray has raised a large quantity of seedlings from the fruit seeds forwarded in October and November last by Mr. Carter, of which several kinds will be shortly ready for distribution.

"*Kitchen Garden.*—Inspected the Kitchen Garden. The stock of pea-seed, now being gathered, will probably be as large as that of last year, as also of carrot, lettuce, and a few other sorts of vegetables, for early distribution to members. Mr. McMurray has been successful in raising a large stock of herbs of eight or ten kinds, from the seed received in November last, from Messrs. Lawson of Edinburgh.

"*Flower Garden.*—Inspected the Flower Garden, which is in good order. Many of the bulbs, and a greater portion of the assortment of seeds of ornamental trees and shrubs, indigenous to the Cape of Good Hope, which were purchased by the Society at the end of last year, have been turned to good account; and plants of the latter are now in a fit state for delivery to members. A large collection of rose plants of various sorts is also available. The stock of Assam orchids presented last year by Col. Jenkins is in fair condition.

"*Sugar Cane.*—Agreed, that the gardener dispose of the residue of the sugar cane at the price he has been offered for them, namely, Rs. 1-9 per 100, leaving a sufficient quantity in hand to plant out a beegah, so as to keep up the stock in the garden.

"*Bullock Shed.* Lastly, the Committee beg to recommend that a sum not exceeding Rs. 16, be allowed for the bullock shed (40+16 ft) which being in a dilapidated state, will require rethatching, and the changing of a few bamboos, before the commencement of the rainy season.

(Signed) W. G. Rose,
W. Storm.
J. Church."

Resolved, that the Report of the Committee be confirmed.

Read also the Gardener's Monthly Report. Mr. McMurray regrets to state that the storm of the 2nd March has caused great destruction to the young fruit trees in the garden, having blown off nearly all the fruit that had set on the mango, peach, litchee and pumplenose trees; such of the trees as were in flower have likewise suffered severely from the violence of the wind, rain and hail. The gardener states he has raised a large supply of young plants of Ceylon coffee and Shiraz tobacco from the seed lately supplied by the Superintendent of the Royal Botanic Garden at Ceylon, and that he will be able to distribute them freely at the commencement of the rainy season. He has also in store a large quantity of tubers of Jerusalem artichoke and of the red yam of Chota Nagpore, for delivery to members requiring them. He adds that Mr. Ladd's present of 12 tubers of the American white sweet potatoe were received and planted on the 9th of February; and that thirteen out of the thirty-three kinds of flower seeds from Sylhet and China, which were lately contributed by Mr. Arbuthnot Emerson, have germinated freely. Mr. McMurray forwards for distribution 86 pounds weight of arrow-root powder, and 36 pounds weight of tapioca powder, prepared from the surplus stock of bulbs raised this season in the garden.

Submitted a memorial from Mrs. D'Cruz, widow of the late gardener, stating that the sum of Rs. 720 which was awarded her in May 1850, to be distributed by monthly instalments of Rs. 30, commencing from the period of the demise of her husband, has been expended, and soliciting further aid from the Society.

Read extract from the proceedings of the Council regretting their inability, with reference to the Resolution passed on the former occasion, to recommend a continuance of the pension, but leaving it to the consideration of the General Meeting, or to subscriptions from individual members.

Adverting to the above, Col. Sage gave the following notice of motion for the next General Meeting:—

"That with reference to Mrs. D'Cruz's Memorial, the sum of Rs. 200 be awarded as a donation, and that she be given to understand that nothing further is to be expected from the Society, and that she must, for the future, endeavour to maintain herself and children."

Communications on various subjects.

The following communications were also laid before the Meeting:—

1. From T. F. Henley, Esq., submitting a paper (with various specimens in illustration) on the preparation of dried sugarcane, and on the manufacture of sugar therefrom; and on the probable suitability of such a manufacture to the climate and circumstances of Bengal.

2. From Mr. Robert Scott, Head Gardener, H. C. Botanic Garden, respecting the introduction of the *Victoria regia*.

3. From D. F. McLeod, Esq., Superintendent Trans-Sutledge States, furnishing a report of an unsuccessful attempt towards the introduction, in

the Kangra District, of the New Granada seed paddy, received last year from the Society.

4. From Dr. Wallich, dated London, 7th January, respecting the testimonial awarded to Mr. Hume, late Honorary Secretary of the Society.

5.—From Willis Earle, Esq., submitting a list of annual and biennial flowering plants, of which seeds might be procured from London. Mr. Earle also gives a report of his trials with the batch of flower seeds—annual and perennial—received last year from Mr. Carter, and suggests the propriety of obtaining the aid of some person, resident in London, to exercise a surveillance on the execution of future orders entrusted to the Society's seedsmen. Referred to the Floricultural Committee.

6.—From Messrs. E. Carver and Co., of Massachusetts, United States of America, advising the despatch of a saw-gin, (which has just been received) to compete for the prize of Rs. 5000.

7.—From Mr. James Landon, dated Broach, February 19, affording some details respecting the working of his saw-gin, and giving certain reasons, for his not being a competitor for the prize.

8.—From W. Seton-Karr, Esq., Under-Secretary Government of Bengal, intimating that the Government of Bombay have ordered the despatch of three bales of Surat *kupass* for testing the machines intended for competition.

The Secretary having brought to the notice of the meeting that several of the machines for cleaning cotton, which have been some time in the Society's possession, would require being put into proper order, if needed for comparative trial with the machines lately received, it was agreed that the sum of Rs. 50 be awarded for that purpose.

Before the Meeting separated, the following motion, of which notice had been given by Baboo Rajendrolall Mittra, was brought forward :—

1st.—"That the Society devote a sum, not exceeding 500 Rupees, for the preparation and publication of an elementary treatise on Botany in Bengalee, for the use of the Society's Agricultural school, and of native malees generally."

2nd.—"That the Translation Committee be requested to submit, through the Council, a plan as to the best way in which the object of the foregoing proposal may be carried out."

The mover addressed the meeting briefly in support of his proposal, which was seconded by Mr. Cantor.

Baboo Peary Chand Mittra proposed, seconded by Baboo Russickissen Mullick, the following amendment :—

"That the Council be requested to report whether a work on the Agriculture and Horticulture of Bengal cannot be prepared in the Bengali language, and printed under the Superintendence of the Society."

The above amendment, together with the original motion, were referred, with the consent of the mover, to the Council for report.

(Saturday, the 17th of April, 1852.)

William Storm, Esq., Senior Member present, in the Chair.

The proceedings of the last General Meeting were read and confirmed.

Elections.

Messrs. John Hayton; D. McDonald; J. A. Loch, C. S; and Anandram Dhekial Phookun.

Candidates for Election.

J. Naesmyth, Esq., C. S. Hoshiarpore, Punjaub,—proposed by the Secretary, seconded by Mr. Geo. Taylor.

M. H. Court, Esq., C. S., Budaon,—proposed by Mr. R. Campbell, C. S., seconded by the Secretary.

H. R. Wilson, Esq., Deputy-Collector, Budaon,—proposed by Mr. Campbell, seconded by the Secretary.

E. Lindstedt, Esq., Calcutta,—proposed by Mr. W. G. Rose, seconded by Mr. W. H. Poe.

W. S. Stiven, Esq., M. D, Civil Assistant Surgeon, Moradabad,—proposed by the Secretary, seconded by Mr. G. Taylor.

David Jardine, Esq., Merchant, Calcutta,—proposed by Mr. James Church, Senior, seconded by Dr. Falconer.

Lieut.-Col. W. G. Brown, (H. M. 24th Regiment,) Sealkote,—proposed by Capt. J. B. Thelwall, seconded by the Secretary.

Presentations.

1. Notulæ ad Plantas Asiaticas. Part 3; and Icones Plantarum, Asiaticarum, Part 3; by the late William Griffith, Esq. (5 copies of each.) *Presented by the Government of Bengal.*

2. Journal of the Indian Archipelago, for November and December, 1851, and January, 1852. *Presented by the Editor.*

3. Copies of the same work for the same months. *Presented by the Government of Bengal.*

4. Journal of the Asiatic Society of Bengal, No. 7. of 1851, and No. 1 of 1852. *Presented by the Society.*

5. A copy of a cheap reprint of "Fenwick's Hand-book of Gardening" in Oordoo. (Mr. Tucker's Prize Essay.) *Presented by H. C. Tucker, Esq.*

Mr. Tucker states that this native reprint of his prize essay has been made at Lucknow; and he considers it the greatest compliment that could have been paid to the work, that natives should have reprinted it for cheap sale (12 annas) on their own account. It proves that they consider the book useful, and worth paying for, and that there is an effective demand for it.

6. A collection of plants of sorts (annual, biennial, and perennial) including 112 pine-apple plants. *Presented by W. Earle, Esq.*

7. A small collection of orchids, geraniums, and other plants, including a fine healthy laburnum. *Presented by Lieut.-Col. Wm. Sage.*

8. A fine collection of orchids of seven or eight sorts. *Presented by J. St. E. Burton, Esq.*

9. A quantity of cuttings, of a yellow rose, and a few other plants. *Presented by Mr. R. Dougherty.*

10. A citron graft of a superior kind from Ceylon. *Presented by Baboo Pronnauth Bose.*

11. A plant of Melastoma Malabathricum. *Presented by W. H. Elliott, Esq.*

12. Samples of the common indigenous coffee of Assam. *Presented by Col. Jenkins, on behalf of Capt. C. S. Reynolds.*

Capt. Reynolds states that the trees from which these musters were picked may be said to be growing wild, for he has taken no care of them, either in pruning or culture. Col. Jenkins observes that he has tasted the decoction from some wild coffee, and it appeared tolerably well flavored; and should it be thought of any value its cultivation might be of some importance to the province, as the plant grows everywhere, and, when not stifled by jungle, it is very luxuriant.

Mr James Cowell states (and the other members of the Committee coincide in his opinion) that,—" it is impossible to ascertain from what stock these musters originally sprung, but from the smallness of bean and a peculiarity about it, I incline to think that originally they may have sprung from Mocha or Malabar stock; and in their wild and uncultivated state, and in being choked by grass or jungle, have dwindled into the abortive state we see them. Perhaps by culture, as Capt Reynolds proposes, the bean may be much improved in size, flavour and appearance, and I think a trial were worthy of attention, for I have long thought that the hilly tracts in Assam and other high parts of this country, would produce excellent coffee, as we have witnessed by the late Col. Ouseley's experiments in Chota Nagpore."

Several exceedingly well-grown plants of German asters, in full flower, raised in Mr B. Warwick's garden, were placed on the table.

A large specimen of the vegetable marrow raised in the Society's Garden from seed received from Lieut.-Col. Handscomb, was likewise brought to the notice of the Meeting.

The following motion, of which notice was given by Lieut-Col. Sage at the last General Meeting, was brought forward :—

" That with reference to Mrs D'Cruz's Memorial, the sum of Rs. 200 be awarded as a donation, and that she be given to understand that nothing further is to be expected from the Society, and that she must, for the future, endeavour to maintain herself and children."

In the absence of the mover, Mr. W. Storm proposed, and Mr. Geo. Taylor seconded the motion, which was put to the vote, and carried.

Read the following report from the Council on the motion and amendment submitted at the last General Meeting by Baboos Rajendralall Mittra and Peary Chand Mittra :—

"The Council having duly considered the motion by Baboo Rajendralall Mittra, and the amendment of Baboo Peary Chand Mittra, referred to them, for report, are unanimously of opinion :—

"1st. That it is not advisable to devote the sum proposed (Rs. 500) for the preparation and publication of an elementary treatise on Botany in Bengalee, there being, in the first place, no work that would suit the wants of the country, from which a translation could be made, nor, in the second place, would a work of such a character, if it could be prepared, be of the slightest use to the present race of native gardeners, on whose account, especially, the mover of the proposal would wish it to be prepared.

"2nd. That with reference to the amendment, there are not yet sufficiently ascertained materials for a work on the Agriculture and Horticulture of Bengal ; but that a plain and untechnical work upon gardening in English (which could be afterwards translated into Bengallee) would be useful, and that the sum of Rs. 500, might be offered to the compiler of the treatise on such a subject ; the same to be submitted to the Society within a given period, and under certain conditions, which may be specified hereafter, should the proposal be entertained by the Society."

Proposed by Dr. Falconer, seconded by Mr. Geo. Taylor and resolved, that the report of the Council be adopted.

Read the following report of the Judge respecting the flower show held on the 10th of April :—" The produce of about 22 gardens was submitted on this occasion, and prizes amounting to Rs. 102, as per list annexed, were awarded to fifteen. A few fair specimens of orchids were exhibited, including Dendrobrum Devonianum, D. formosum, D. densiflorum, D. vaginatum, D. transparens, D. secundum, D. Paxtonii ; Cymbidium aloifolium ; Saccolabium guttatum ; Vanda Roxburghii ; V. teres ; Epidendrum crassifolium ; Oncidium luridum, and Phaius species. The German Asters were well represented, shewing a decided improvement in number and in quality. A few well-grown plants of Gloxinias and Achimines were shown, as also of Cinerarias and Solidago Canadensis. There were two new varieties of verbenas, a few fine examples of Gladioli and Hippeastrum ; well-grown plants of Stephanotis floribunda, Parsonsia corymbosa, and a few good cut specimens of Dahlias.

"The collection of plants was altogether limited, as was to be expected at this season of the year.

(Signed.) H. Falconer, M. D."

The Gardener's monthly report was submitted. Mr. McMurray forwards seven maunds of peas of 17 sorts, being the crop raised in the Society's Garden during the season 1851-52 from American, Cape, and acclimated seed; and which sorts, he states, are equal in quality to the seed sown. A tabular statement of the above crop accompanies the report, wherein the result of each kind (imported and acclimated) is separately exhibited; and from which it appears that the produce raised from the acclimated seed of last year is greater than that obtained from imported seed.

The gardener likewise forwards for distribution a small quantity of seed of American Sumach, (*Cæsalpinia coriaria*) the first of the produce gathered from the trees growing along the west belt in the Society's Garden. Mr McMurray gives, in continuation of his last report, an account of the destruction caused by the severe storm of the 3rd of April to a few of the trees, and to some of the thatched buildings in the garden; he also adds a detailed list of the contributions from various members of the Society, noticed under the head of presentations.

Read a letter from Lieut-Col. Wm. Sage, resigning the office of a Vice President of the Society, consequent on his departure for the Central Provinces.

Read also the following recommendation of the Council, to be considered at the next General Meeting, in accordance with Section 5 Chapter X. of the Rules of the Society:—

"That Sir Arthur Buller, a member of the Council, be recommended to fill the vacancy caused by Col. Sage's resignation; and further, that in the event of the General Meeting adopting the recommendation, Mr C. A. Cantor be nominated to fill the vacancy in the Council caused by such election."

Read the following letter from the Government of Bengal respecting the proposed introduction into India of the Quinine-yielding Cinchonas of South America:—

To the Secretary to the Agricultural and Horticultural Society, dated Fort William, the 1st April 1852.

Sir,— With reference to your letter dated the 23rd February last, and enclosure, I am directed by the Most Noble the Governor of Bengal to state that the Government of India, to whom a reference was made on the subject, have intimated that the proposal therein made for deputing a qualified person from England to South America to procure seeds and young plants of the best species of the Quinine-yielding Cinchonas, will be submitted to the Hon'ble the Court of Directors with the recommendation of the Governor-General in Council.

I have, &c.,
(Signed.) W. SETON-KARR,
Under-Secy. to the Govt. of Bengal

Communications on various subjects.

The following letters were also submitted :—

1. From Lieut. Colonel Francis Jenkins, dated Gowhatti, March 27, expressing his grateful thanks for his election as an Honorary Member of the Society.

2 From Captain Albert Fytche, Principal Assissant Commissioner of Arracan, presenting a report on the Tobacco of the Sandoway District, its mode of culture, &c. Referred to the Committee of Papers.

The Secretary intimated that the specimens of tobaco, and seed, referred to in the above report, had not yet been received.

3. From Willis Earle, Esq., offering several suggestions on horticultural subjects ; namely, in respect to the proposed New Garden, to the procuring of certain plants from South America, and in regard to prizes and other matters connected with the vegetable and flower shows. Referred to the Council.

4. From Dr. Wallich, dated London, 19th January and 16th February, reporting progress respecting the Testimonial to Mr Hume, late Honorary Secretary of the Society.

5. From F. Gouldsbury, Esq., Superintendent Tributary Mehels, Cuttack, applying for a quantity of American cotton seed for distribution in certain parts of that District.

It was agreed, on the recommendation of the Council, to register the above application, to be met from the consignment expected in all July from the United States.

6 From T. P. Woodcock, Esq., offering to the Society, at cost price, a collection of seeds indigenous to South Australia, lately received by him. Agreed, on the recommendation of the Council, to purchase the collection.

The minutes of the Floricultural Committee on the letter of Mr Earle, which was referred to them at the last General Meeting, were likewise submitted. The Committee coincide in Mr Earle's suggestion to obtain the friendly assistance of some competent person in London to supervise the execution of orders intrusted to the Society's seedsman, and propose that Dr. Wallich be solicited to undertake the commission, and that a copy of Mr. Earle's copious and lucid letter on the subject of seeds, &c. be sent to him. Agreed to.

(Saturday, the 8th May, 1852.*)*

W. G. Rose, Esq., Vice President, in the Chair.

Read a note from the President, regretting his inability to preside at the Meeting in consequence of indisposition.

The proceedings of the last General Meeting were read and confirmed.

Elections

Messrs. J. Naesmyth, C. S.; M. H. Court, C. S.; H. R. Wilson; E. Lindstedt; David Jardine; Dr. W. S. Stiven, and Lieut. Col. W. G. Brown.

Candidates for Election.

David Maxwell, Esq., of Mendy Ghaut, Futteeghur,—proposed by the Secretary, seconded by Mr. W. Storm.

H. S. Cave, Esq., Indigo planter, Purneah,—proposed by Mr. E. Mackintosh, seconded by Mr. A. E. Russell.

J. Western, Esq., V. S, Horse Artillery, Bangalore,—proposed by Major W. K. Lloyd, seconded by the Secretary.

Presentations.

1. Memoires de l'Académie des Sciences, Belles Lettres et Arts de Lyon. Classe des Sciences, vols. 1 and 2; Classe des Letters, vols. 1 and 2; 1848-50. *Presented by the Academy*

2. Journal of the Asiatic Society of Bengal, No. 2 of 1852. *Presented by the Society.*

3. Specimens of the bark, fibre, cotton, thread, twine, cord and rope from the Müddär plant, (Asclepias gigantea?) prepared at Leia in the Punjab. *Presented by Capt. G. E. Hollings.*

4. Sample of paddy raised at Darjeeling from New Granada seed received from the Society in April 1851. *Presented by Dr. Campbell.* (Referred to the Grain Committee.)

5. Two samples of wool from Thibet. *Presented by Dr. Campbell.*

Dr. Campbell's object in forwarding the above is to obtain an estimate of the probable market value of the article in Calcutta. "I require this information," adds Dr. Campbell, "for the Thibetan traders who annually visit Darjeeling, and who will not risk bringing wools so far, without some knowledge of the price it would fetch in Calcutta."

Mr. Haworth, who was present at the Meeting, kindly promised, at the request of the Chairman, to give the required information.

6. Specimens of the "Room" dye of Assam (*Ruellia*—— ?) and of cloths dyed with it. *Presented by Lieut. Col. Jenkins on behalf of Major Vetch.*

Col. Jenkins states that Major Vetch's object in sending these is to know what might possibly be the market value of the article. "It dyes a very black permanent blue, and Major Vetch thinks it might be made useful as the first colouring matter used in dyeing black cloths."

In a subsequent communication, Major Vetch gives the following, as the mode pursued by the Hill tribes in applying the "Room":—

"Dissolve the dye in water filtered through wood ashes, and allow to stand exposed to the sun for four or five days; then steep the cloth, or article to be dyed, as often as may be requisite to obtain the shade desired; wash in cold water, and dry:—and to fix, add to the dyeing material fermented rice water, in which again steep the article as long as may be found requisite (say a day and night) and then put out to dry, when the operation is complete."

The Secretary stated that Mr. Dodd (of Messrs. Thomas, Marten and Co.) to whom he had referred these dye specimens to be valued, pronounces them to be only equal to what is called "Washings," and of a rather inferior quality and worth perhaps about 20 rupees per maund. Dr. Porteous (of Messrs. Bathgate and Co.) to whom the dye stuff was afterwards transferred, reports that he has not made anything satisfactory of it, being unable to get it to fix on the cloth.

It was agreed to apply to Major Vetch for a larger supply of the "Room," with a view to its transmission to the E. I. and China Association for report.

7. A small assortment of vegetable seeds from Cabul and Peshawur, consisting of turnip, carrot, cabbage, onion, melon, &c. *Presented by Capt. F. C. Burnett.*

8. A few seeds of Malta melon, Malta cucumber, and Malta brown cotton. *Presented by H. Piddington, Esq.*

9. A few Rose plants of sorts. *Presented by Andrew D'Cruz, Esq., Junior.*

10. Four plants of azaleas, there of camellias, and a mangosteen. *Presented by Arbuthnot Emerson, Esq.*

11. Three budded peach trees, and a plant of magnolia grandiflora. *Presented by W. Stalkartt, Esq.*

12. A few seeds of theobroma cacao, and of American red maize. *Presented by J. E. Burton, Esq.*

Samples of cotton raised in the Society's garden, from Petti gulph seed sown in August last, were placed on the table; also six handsome varieties of Gloxinias, viz: G. handleyana, G. exquisita, G. cærulea, G. rosea, G. maxima alba, and G. atrosanguinea, from Mr. B. Warwick's garden.

The recommendation of the Council, of which notice was given at the last General Meeting, proposing Sir Arthur Buller for the office of a Vice-President of the Society, vacant by the resignation of Lieut. Col. Wm. Sage, was duly submitted and unanimously adopted.

The second recommendation of the Council, proposing Mr. C. A. Cantor to fill the vacancy in the Council, caused by the election of Sir Arthur Buller to the office of a Vice-President, was also submitted and unanimously adopted.

Premium for a Manual of Gardening.

Read the following report from the Council :—

"In continuation of their report, laid before the last Monthly General Meeting, the Council now beg to submit the form of conditions under which they propose the prize shall be offered for the best treatise on gardening as applicable to Bengal.

The Council recommend that instead of Rs. 500, as originally proposed, a premium of Rs. 1,000 be offered for the above work ;—the former sum being, on further consideration of the subject, deemed insufficient for the work required to be performed, as pointed out in the second clause of the conditions."

The following are the conditions referred to :—

"1st. The treatise must be as plain and untechnical as the nature of the subject will admit.

"2nd. It must treat fully on the culture of fruits, vegetables and flowers of all descriptions, whether indigenous, or such as have been introduced into Bengal to the present time; giving practical hints on grafting, budding, pruning, propagating, transplanting, &c; with descriptions of manures,—vegetable and animal,—best adapted to certain plants. A calendar of operations for every month throughout the year must form an appendix to the work, and it must also have a copious alphabetical index.

"3rd. Intending competitors must submit their treatises on, or before, the 1st June, 1854.

"4th. The author shall have the option of publishing the successful treatise in such a form as the Society may determine, within six months after the announcement of the award, with entire interest in the copyright; or in case of his declining the risk, the Society shall be at liberty to publish the treatise in its Journal or separately, as may be deemed expedient; the entire interest in the copyright, in that case, to be vested in the Society.

"5th. The Society shall have the option of publishing a Bengallee translation of the above work at its discretion.

"6th. The Society reserves to itself the right of withholding the above premium, should none of the treatises be approved of by the Committee which will be appointed to report on them."

Resolved,—that the report of the Council be adopted as respects the conditions proposed.

In reference to the proposed premium Mr. Cantor desired, as required by the rules, to give the following notice of motion for the next General Meeting :—

"That in accordance with the recommendation of the Council, the sum of Rs. 1,000 be offered as a premium for the best treatise on practical gardening, as applicable to Bengal."

Communications on various subjects.

1. From W. Muir, Esq., Secretary to the Government N. W. Provinces, forwarding two copies of "Suggestions for the Importation of Tea-makers, Implement, and seeds, from China into the N. W. Provinces, drawn up by Dr. Jameson, Superintendant of Tea-Plantations."

2. From Captain G. E. Hollings, an interesting return respecting the Agricultural statistics of the Pergunna Leia Khass, in the district of Leia, Punjaub.

3. From Dr. Campbell, respecting his trial, in the vicinity of Darjeeling, of the New Granada paddy received last year from the Society.

4. From Capt. G. E. Hollings, respecting the value of the Mŭddār as a fibrous yielding plant.

The above four communications were referred to the Committee of Papers.

5. From Lieut. Colonel F. Jenkins, submitting a letter to his address from Mr. Simons of Gowhatti, proposing to exchange his orchids for fruit and flower plants from the Society's Garden.

Agreed to on the recommendation of the Council.

6. From H. V. Bayley, Esq., applying for any of the Society's publications in the vernacular for the use of a Reading Room Library, which it is proposed to establish at Hooghly.

It was agreed that a copy of the first and second volumes, in Bengallee, be forwarded to Mr. Bayley.

7. From H. Frost, Esq., Dharwar, advising despatch of a gin of his construction to compete for the Government prize of Rs. 5,000.

The Secretary brought to the notice of the Meeting,—many of the members not being, apparently, aware of the circumstance,—that resident members had the privilege of obtaining the loan of books fro the Society's library, as also the several periodicals received by each monthly mail.

(*Saturday, the* 12*th June*, 1852.)

W. G. Rose, Esq., Vice President, in the Chair.

The proceedings of the last General Meeting were read and confirmed.

Elections.

Messrs. David Maxwell ; H. S. Cave ; and J. Western.

Candidates for Election.

The Honorable Barnes Peacock,—proposed by Sir Arthur Buller, seconded by Sir James Colvile.

Brigadier George Hampton, commanding Hyderabad Division, Nizam's Army,—proposed by Brigadier James Johnston, seconded by the Secretary.

Surgeon T. W. Whitelock, 4th Regiment Nizam's Infantry, Hingolee,—proposed by Brigadier Johnston, seconded by the Secretary.

J. J. Ward, Esq., Civil Service,—proposed by Mr. A. Grote, seconded by Dr. Falconer.

Lieutenant A. R. E. Hutchinson, Bheel Agent, Bhopawur,—proposed by Dr. George Tranter, seconded by the Secretary.

H. H. Greathed, Esq., Civil Service,—proposed by the Secretary, seconded by Mr. W. G. Rose.

Dr. J. K. Walter, Civil Surgeon, Rungpore,—proposed by Mr. H. Rehling, seconded by the Secretary.

H. Ricketts, Esq., Civil Service,—proposed by Mr. Grote, seconded by Mr. A. J. M. Mills.

Alexander E. Brown, Esq., of Doulutpore factory, Durbungur,—proposed by Mr. G. N. Wyatt, seconded by the Secretary.

John G. Ross, Esq., Deputy Magistrate and Deputy Collector, Rohtuk, proposed by Lieut.-Col. P. T. Cautley, seconded by Lieut. A. D. Turnbull.

Baboo Joykissen Mookerjee, Zemindar, Hooghly,—proposed by Rajah Pertab Chunder Singh, seconded by Baboo Peary Chand Mittra.

Major T. Martin, officiating Presidency Pay Master,—proposed by Mr. George Taylor, seconded by the Secretary.

W. T. Lewis, Esq., of Penang, was proposed, on the recommendation of the Council, as a corresponding member of the Society.

Presentations.

1. Selections from the Records of the Bengal Government, No. VI. Report on the Tin and other Mineral productions of the Tenasserim Provinces. *Presented by the Government of Bengal.*

2. Proceedings of the Agri-Horticultural Society of the Punjaub, May to December, 1851. *Presented by the Society.*

3. Indian Journal of Arts, Sciences, and Manufactures, Parts 1 to 6. *Presented by E. Wingrove, Esq.*

4. Journal of the Indian Archipelago for February, 1852. *Presented by the Editor.*

5. A copy of the same work for the same month. *Presented by the Government of Bengal.*

6. Journal of the Asiatic Society of Bengal, No. 3, 1852. *Presented by the Society.*

7. 24 kinds of orchid plants from Assam. *Presented by Lieut.-Col. F. Jenkins.*

8. A maund of fresh Chota Nagpore coffee seed. *Presented by Major J. Hannyngton.*

9. A quantity (3 quarts) of Sandoway Tobacco seeds, and specimens of the Tobacco. *Presented by Capt. A. Fytche.*

The above seed (coffee and tobacco) are available to members, and early applications are recommended.

10. Specimen of pine apple fibre and two coils of running rigging made therefrom; also specimen of "Jubbulpore hemp," and fishing line and tarred rigging made from the same. *Presented by Messrs. W. H. Harton and Co.*

11. Three specimens of cloths manufactured from nettle fibre. *Presented by Lieut.-Col. Jenkins, on behalf of Major S. F. Hannay.*

The following is extract of Major Hannay's note respecting these cloths, which are sent only to shew that these nettles are turned to some use by those who have no cotton:—

"No. 1. Is a specimen of a chudder or cloth made from the nettle, No. 5 of my list of the textile fibres of Assam, published in Vol. VII. of the SOCIETY'S JOURNAL—the "Hooroo Surat," (*Urtica ferox*) a stinging creeper, called also "Thengma" by the Chinese. The cloth is woven and worn by the Takak Nagas of the Derap, east of Magoon.

"No. 2. One plain and one coloured jacket made from an *Urtica* stinging nettle. No. 4 of my list, called in Assamese "Doominee Surat," and worn by the Soolee-cutta or short-haired Mishmees of the Dibong, who also manufacture narrow slips of stout canvas of this and some of the other nettles, which is a good deal used in making sacks and bags by the people about Saikwah, where they have a ready sale for them."

12. Specimen of aloe fibre from Upper Assam. *Presented by Major Hannay.*

13. A quantity of the bark of the tree called iron wood tree in Arracan. *Forwarded by Capt. Phayre, on behalf of W. D. Brown, Esq.*

Capt. Phayre states that this tree is very abundant in the forests of Arracan, and the bark, which is believed to be a good tanning substance, might be procured in large quantities.

Mr. Teil, to whom the bark was referred, has been kind enough to furnish the following report on it:—

"The bark possesses considerable tanning properties, but from its high color, it does not, as will be seen from the specimen sent, produce leather of a quality that would be readily saleable. It very much resembles a common kind of tannage used by the native tanners in this country, viz., the bark of the "gurran" tree, which is commonly used for making fences: it resembles, and its properties are much the same as that received from Arracan. Neither the gurran bark, nor that from Arracan, could, in my opinion, be used as a tanning substance by others than the natives, who are not particular as to color."

14. Three specimens of aloe fibre in different stages of preparation. *Forwarded by R. N. C. Hamilton, Esq., Resident at Indore, on behalf of Dr. George Tranter of the United Malwa Contingent.*

The following report on the above has been kindly furnished by Capt. A. Thompson, a member of the Hemp and Flax Committee :—

"I have tested the aloe fibres from Indore and find the strength quite equal to the best Russian hemp. It would answer very well for the running rigging of ships. The staple is much shorter than that of hemp, which is somewhat against its being favorably looked upon by ship captains.

"A considerable quantity of fibre exactly similar, has lately been imported from the Malabar Coast, and I have made some into rope which very much resembles Manilla rope, but time is required to test its durability. The value here at present is about five rupees per Bazar maund, but were it once brought into general use, it would no doubt command a higher price."

15. A description of wild paddy called "Tenni," from the jheels in the Azimghur district. *Presented by A. J. Sturmer, Esq.*

The motion, of which notice was given at the last General Meeting by Mr. Cantor,—"That, in accordance with the recommendation of the Council, the sum of one thousand rupees be offered as a premium for the best treatise on practical gardening, as applicable to Bengal," was, in the absence of the mover, taken up by Baboo Peary Chand Mittra, and carried unanimously.

On the recommendation of the Council, the following gentlemen were appointed a Special Committee to examine and report on the cotton cleaning machines which have been sent in to compete for the Government prize of five thousand rupees :—

Messrs. W. Haworth, T. F. Henley, William Munro, F. J. Siddons, John Thomson, J. M. Vos, and John Ward.

Nursery Garden.

Read a report from the Garden Committee on the damage done to the garden by the gale of the 14th and 16th of May. From an analysis of the statement furnished by the gardener and which is annexed to his report, it would appear that 170 flowering plants, shrubs, and seedlings, have been completely destroyed ; that 30, including trees, have been seriously damaged and disfigured ; that 112 mango grafts, attached to the trees, and 24 of the stock in store have been destroyed, as also plaintain trees and sugar cane. A large quantity of fruit in an unripe state, especially of mangoes, peaches and lychees, have been blown off, not leaving one remaining on the trees. Several bell glasses have been broken, arbors blown down ; and the thatch work and brick pillars of the Conservatory completely prostrated.

The Committee visited the Garden on the 25th of May and found it altogether in a better condition than they had anticipated. The cloudy weather and showers of rain experienced since the gale have proved favorable, assisting to restore many plants, not included in the Gardener's statement, which had been shaken at the roots, and were partially prostrated.

The Committee conclude their report by stating that they had authorized the Gardener to rebuild the brick pillars and place a new thatch on the Conservatory at a cost not exceeding Rs. 52, according to the estimate which he has furnished.

Resolved that the Report be confirmed.

The Gardener's Monthly Report was submitted. Mr. McMurray gives a brief account of his mode of cultivating the various descriptions of pot herbs, raised from seed received last year from Messrs. Lawson and Sons of Edinburgh, and with which he has been very successful. He alludes to several late contributions to the Garden and adds, for the information of members, or others who may be in want of fruit trees, that he has now in store 560 mango grafts of ten kinds, and a few other varieties of fruit trees ready for issue at the fixed rates. Mr. McMurray also submits a statement of the distribution of flowering plants and fruit trees from the Garden during the past twelve months, from June 1851 to May 1852, shewing an aggregate of 11,000, exclusive of a quantity of sugar cane, and tubers and roots of Jerusalem artichokes and yams of sorts.

Report on Müddär Fibre from the Punjab.

A favorable report was handed in by the Hemp and Flax Committee on the musters of the fibre of the müddär (*Asclepias gigantea ?*) and rope and twine made therefrom, which were presented by Capt. G. E. Hollings at the last General Meeting.

Report on Tibetan Sheep's Wool.

Read a report from Mr Wm. Haworth on two musters of Tibetan sheep's wool, which were sent by Dr. Campbell of Darjeeling, and submitted at the last General Meeting.

Communications on various subjects.

1. From Major S. F. Hannay, intimating that the muster of fibre which was submitted at the General Meeting of the Society in December last, is the produce of *Sida rhomboidea.* Major Hannay adds that it grows luxuriantly at Saikwah.

2. From Capt. A. Thompson reporting on the above fibre. "After testing the strength of this fibre, and ascertaining its indestructibility by water, I am convinced it is not jute, as was originally supposed. I think from the length of the staple, its similarity to silk, and its great strength, that it would fetch a high price in England. The line (only half an inch in circumference) sustained, after exposure to wet and sun for ten days, 400lbs."

3. From Sir Arthur Buller, returning his best acknowledgments for his election to the office of a Vice-President of the Society.

4. From the Secretary, Board of Revenue, Fort William, forwarding a communication from Major S. F. Hannay, respecting the nettle grasses of Upper Assam. (Referred to the Committee of Papers.)

5. From Dr. Royle, enclosing a circular from Messrs. Eisdell and Aschcombe of London respecting the establishment of an agency for Indian products.

6. From the Under-Secretary, Government of Bengal, forwarding two cases of Madras "Kupass" or seeded cotton, to test the machines sent in to compete for the Government prize of Rs. 5,000.

7. From W. Muir, Esq., Secretary to Government N. W. P., Agra, giving a list of certain cotton cleaning machines, which are available to the Society, if required.

Read a letter from Messrs. Burn and Co., suggesting that no time should be lost in removing one step towards the western approach of the verandah of the Metcalfe Hall, the building having sunk so considerably on that side, and annexing an estimate of the cost thereof, amounting to Rs. 155-6-3.

Read a letter from the Secretary of the Public Library, intimating the readiness of the Curators to bear one-half of the above cost.

Resolved, on the recommendation of the Council, that the Society bear their share of the expense, as also an additional sum of Rs. 36 for sundry wood-work to the western venetian doors and centre door, and for painting the latter.

It was further agreed, that a sum, not exceeding one hundred rupees, be allowed for furniture ("4 what nots") for the Council Meeting Room, for specimens of wood.

Moon's Phases	Observed at 9 H 50 M.					Observations made at Apparent Noon					Observed at 4 P M					Observations made at Sunset					Rain Gauges	
		Temperature			Wind		Temperature			Wind		Temperature			Wind		Temperature			Wind	Elevation	
																					Feet 6[illegible].	Feet 5
	Barometer reduced to 32 Fahrenheit	Of the Mercury	Of the Air	Of Wet Bulb	Direction at 9 h 50 m	Barometer reduced to 32 Fahrenheit	Of the Mercury	Of the Air	Of Wet Bulb	Direction at Noon	Barometer reduced to 32 Fahrenheit	Of the Mercury	Of the Air	Of Wet Bulb	Direction at 4 p m	Barometer reduced to 32 Fahrenheit	Of the Mercury	Of the Air	Of Wet Bulb	Direction at Sunset	Upper	Lower
	Inches	o	o	o		Inches	o	o	o		Inches	o	o	o		Inches	o	o	o		Inches	Inches
	30 054	6[illegible] 7	71 5	64 8	W N W	30 010	74 0	76 6	66 3	N N W	29 921	78 4	77 8	[illegible]	N W	29 937	75 0	73 2	65 0	N N.W		. .
	.162	65 7	68 0	57 4	N N W	101	71 4	73 4	59 0	Ditto	30 013	73 6	[illegible]	58 8	Ditto	30 [illegible]	71 4	70 0	60 3	N W		. .
	161	63 0	66 0	58 [illegible]	N	090	70 2	72 6	61 4	Ditto	004	74 0	[illegible]	61 8	Ditto	011	72 0	71 0	63 4	W		. .
	.109	66 0	66 5	62 0	Ditto	043	[illegible]	74 6	[illegible]	N	29 965	[illegible]	[illegible]	63 [illegible]	W	29 969	[illegible]	71 7	64 4	Calm		. .
	092	65 6	69 0	62 4	Ditto	043	72 0	74 2	65 0	N W	945	75 2	74 5	64 4	W	95[illegible]	73 [illegible]	71 9	65 6	N W		. .
	.132	65 0	69 0	61 8	E	047	[illegible]	74 2	64 0	N N W	974	75 4	74 6	64 0	Ditto	961	73 2	[illegible]	64 8	N N W		. .
⊙	112	65 0	68 5	62 2	N E	072	[illegible]	74 5	[illegible]	N	984	75 4	74 5	62 8	N	959	73 0	72 0	63 4	N W		. .
	102	65 6	69 2	61 8	E	049	[illegible]	74 2	[illegible]	N E	954	75 6	75 0	63 3	N W	962	73 5	72 4	65 2	[illegible] E		. .
	066	66 6	69 4	62 8	N W	026	71 6	73 5	65 3	S W	923	[illegible]	[illegible]	65 3	W S W	[illegible]	73 5	[illegible]	66 0	N. W		. .
	.030	68 2	71 2	63 8	W N W	29 957	[illegible]	74 3	64 8	N W	[illegible]	78 0	77 4	[illegible]	S [illegible] W	966	75 6	74 8	66 0	S		. .
	010	67 8	69 2	62 2	N W	.970	71 6	73 3	64 0	N	895	[illegible]	74 0	64 4	W	907	[illegible]	[illegible]	65 0	N		. .
	108	61 9	64 0	53 8	N	30 062	68 0	69 3	55 5	Ditto	[illegible]	[illegible]	71 0	58 0	N	986	69 5	68 0	58 5	Ditto		. .
☾	104	62 0	64 9	55 0	E	043	68 4	71 5	57 7	E N E	989	72 8	71 8	58 6	N W	989	70 [illegible]	68 8	60 0	Ditto		. .
	092	63 4	67 2	58 0	Ditto	029	70 6	73 4	60 2	N E	940	75 6	75 0	62 8	S	937	73 [illegible]	72 [illegible]	63 9	N E	0 72	0 80
	026	65 0	66 4	64 2	N E	29 982	70 5	71 8	67 5	N W	891	74 6	74 0	63 4	N W	902	72 2	70 5	64 4	N		. .
	015	63 7	66 2	59 4	Ditto	954	70 3	72 4	62 4	N E	894	75 9	74 6	64 [illegible]		895	[illegible]	72 2	65 0	N N E		. .
	.063	64 7	67 2	57 2	N	30 004	71 [illegible]	73 0	60 2	N N E	941	[illegible]	74 0	60 9	Ditto	961	[illegible]	71 0	61 4	Ditto		. .
	107	63 0	66 0	56 0	N N E	055	70 2	71 9	[illegible]	Ditto	965	73 6	73 0	62 0	Ditto	969	72 0	71 2	61 5			. .
	.112	62 6	65 2	56 [illegible]	N E	064	70 0	72 2	58 9	N E	990	74 0	73 3	59 7	Ditto	991	71 3	70 0	60 5	N N W		. .
	120	62 6	65 2	55 0	Ditto	059	69 3	71 4	58 6	Ditto	980	74 0	73 2	60 4	S E	[illegible]	71 0	69 3	62 4	N	0.11	0 12
●	108	62 7	63 6	59 3	Ditto	101	61 4	60 5	58 5	N W	30 012	62 6	63 3	59 7	N	30 005	63 0	63 0	59 7	N		. .
	.123	63 1	64 4	59 0	Ditto	082	68 0	70 5	62 2	N N E	013	71 8	71 7	64 0	N N E	027	70 0	69 6	62 8	N N E		. .
	135	64 4	65 2	61 2	Ditto	096	66.5	67 4	63 2	N E	040	65 6	66 0	64 4	E	028	65 6	65 2	64 2	E	0 53	0 58
	.176	62 6	62 8	61 9	E	143	63 0	63 4	62 4	Ditto	068	65 0	66 4	65 0	N E	077	66 0	66 2	65 0	N. E	0 06	0 08
	198	65 4	66 4	65 4	N E.	.146	67 3	69 4	67 0	N	[illegible]	74 0	73 7	64 2	E S E	[illegible]	71 8	71 3	64 4	N W E		. .
	199	66 0	68 0	61 2	N	128	71 7	72 8	63 0	Ditto	017	75 7	74 0	62 5	N W	026	[illegible]	71 [illegible]	63 6	N.		. .
	.121	64 4	67 0	60 4	W N W	070	70 2	72 4	62 8	N. W	29 9[illegible]3	75 0	74 0	61 6	Ditto	29 972	71 6	70 6	63 5	N W		. .
	085	65 3	69 0	64 0	S W	016	[illegible]	75 0	64 4	W N W	914	77 2	76 6	[illegible]	W	929	73 7	72 3	65 2	Ditto		. .
☽	.054	68 0	71 9	66 5	N E	29 997	74 4	77 0	66 4	N E	906	79 4	78 0	65 6	N	927	75 8	74 5	65 7	N.		. .
	102	63 5	65 5	64 0	N	30 043	71 8	75 3	66	N	.941	79 2	78 0	67 2	Ditto.	953	[illegible]	74 4	67 3	Ditto		. .
	062	67 8	70 5	64 7	N W.	003	75 0	77 8	67 8	N W	929	80 9	80 7	66 7	Ditto	942	[illegible]	76 0	68 8	N. W		. .
	30 101	64 8	67 3	60 7		30 048	70 4	72 4	62 6		29 963	74 3	73 7	63 1		29 971	[illegible]	71 0	64 0		1 42	1 58
	30 116	66 8	68 8	63 3		30.067	72 1	73 7	64 7		29 963	75 8	75 3	64 7		29 990	73 5	72 4	64 7		0 00	0 07

These Observations have been made for the most part with a supply of new and first rate Instruments received
the Observatory by orders of the Bengal Government a brief description of the Instruments seems necessary

Barometer by Troughton used prior to the 1st June 1844 Observations reduced to 32° Fah = 29.493
by Col Everest used from 1st June to 31st August 1844 . Ditto = 29 637
No 52 Standard Barometer by Newman used from 1st Sept [illegible]

Moon's Phases.	Observed at 9 H. 50 M.					Observations made at Apparent Noon.					Observed at 4 P. M.					Observations made at Sunset.					Rain Gauges.	
		Temperature.			Wind.		Temperature.			Wind.		Temperature.			Wind.		Temperature.			Wind.	Elevation.	
																					Feet. 60.	Feet. 5.
	Barometer reduced to 32° Fahrenheit.	Of the Mercury.	Of the Air.	Of Wet Bulb.	Direction at 9 h. 50 m.	Barometer reduced to 32° Fahrenheit.	Of the Mercury.	Of the Air.	Of Wet Bulb.	Direction at Noon.	Barometer reduced to 32° Fahrenheit.	Of the Mercury.	Of the Air.	Of Wet Bulb.	Direction at 4 p. m.	Barometer reduced to 32° Fahrenheit.	Of the Mercury.	Of the Air.	Of Wet Bulb.	Direction at Sunset.	Upper.	Lower.
	Inches.	o	o	o		Inches.	o	o	o		Inches.	o	o	o		Inches.	o	o	o		Inches	Inches
	30.058	70.2	74.0	65.6	E. N. E.	29.997	78.0	81.0	66.4	N. ..	29.916	83.0	82.6	66.0	N. ..	29.920	79.3	78.0	66.0	N. ..	...	...
	.027	70.6	74.8	66.2	S. W...	.977	78.3	81.2	66.4	W. ...	.874	83.0	82.8	65.7	W. ..	.873	78.8	77.6	69.8	W. ..	...	...
	.036	71.2	74.2	66.4	W. S. W.	.985	77.9	81.2	68.8	Ditto. ...	.893	84.3	84.0	68.0	S. W. ...	.902	80.0	78.8	69.8	S. W...	...	...
	.079	69.0	72.7	69.8	S. W. ...	30.058	76.0	78.7	70.6	W. N. W.	.943	83.4	83.4	70.8	Ditto. ...	.936	80.2	79.2	71.6	S. ...	...	...
	.121	70.4	72.6	62.0	N. W....	.095	76.4	78.0	61.6	N. W....	30.011	80.9	80.2	64.0	N. W...	30.021	78.0	75.9	65.3	N. W...	...	...
⊙	.146	68.6	72.3	62.3	N. N. W.	.106	74.7	76.8	61.3	Ditto. ...	29.991	80.4	79.6	62.4	W. N. W.	29.991	76.0	74.0	60.3	Ditto...	...	...
	.062	69.8	73.2	61.2	W. N. W.	.011	76.0	78.2	62.8	W. ..	.900	81.2	80.6	64.2	N. W....	.899	77.4	76.0	66.9	S. W....	...	...
	.000	70.4	72.3	69.8	S. W. ...	29.937	76.0	77.7	68.5	S. W. ...	.866	82.5	82.2	70.0	S. ...	.881	79.5	78.0	70.3	Ditto...	...	...
	.066	71.2	74.1	69.9	N. W....	30.015	77.9	80.5	65.2	E. ...	.917	83.9	83.5	65.0	N. N. W.	.926	80.2	78.4	68.5	N. N. W.	...	...
	.069	72.0	75.1	70.1	W. ...	.013	77.9	80.0	71.0	S. W. ...	.906	82.9	83.0	69.8	W. ...	.900	80.2	78.0	70.4	E. N. E.	...	...
	.024	73.9	77.1	71.9	S. S. W.	29.967	81.0	83.5	68.5	S. ...	.889	84.8	84.1	70.1	S. S. W.	.906	81.2	79.8	68.7	S. W...	...	...
☾	.037	75.0	78.2	71.1	Ditto. ...	.983	81.0	83.3	72.0	S. S. W.	.874	86.0	85.2	72.0	S. ..	.890	83.0	82.1	72.0	S. ..	...	...
	.025	74.9	77.2	71.0	S. W. ...	.982	80.1	83.0	70.0	W. S. W.	.880	86.6	86.9	72.1	S. W. ..	.882	83.9	82.0	72.9	S. W....	...	...
	.028	74.0	77.0	69.8	E. S. E	.967	81.7	84.6	72.4	S. S. E.	.873	88.0	88.6	70.9	W. S. W.	.874	84.2	81.9	66.5	E. N. E.	...	...
	.022	74.2	77.8	68.9	W. ...	.967	82.2	84.0	70.4	W. S. W.	.861	88.4	89.5	70.5	W. ...	.864	84.5	82.9	74.0	N. W...	...	...
	29.971	76.0	79.0	68.0	S. W. ..	.918	84.0	86.5	71.9	Ditto. ...	.822	90.5	91.0	70.0	W. S. W.	.821	86.5	84.6	72.5	S. ..	...	...
	.972	75.0	79.0	69.3	N. W. ..	.932	83.5	87.0	67.0	N. W....	.833	89.5	90.3	67.5	N. W. ...	.834	85.4	83.5	70.3	N. W. ...	...	...
	.983	76.8	80.4	64.7	N. N. W.	.944	84.5	87.0	66.0	N. N. W.	.838	90.0	91.0	68.0	W. ..	.841	85.6	83.5	71.0	W. ...	...	...
●	30.041	76.0	79.5	62.5	N. ...	.969	82.0	84.0	62.5	N. .	.887	85.6	86.3	64.6	N. W. ...	.888	83.6	83.4	68.0	N. W....	...	...
	29.991	72.0	75.9	60.9	N. N. E.	.949	79.0	81.0	60.8	N. N. W.	.838	84.7	83.7	61.7	W. ..	.829	80.2	78.5	66.1	S. ...	...	...
	.952	72.0	75.2	66.2	W. S. W.	.863	79.5	82.9	63.9	W. ..	.815	86.0	86.5	64.6	N. W...	.830	82.4	81.0	70.0	Ditto...	...	...
	30.038	71.9	75.5	68.3	W. ..	30.069	79.3	82.0	72.3	S. W. ...	.910	86.0	86.6	67.8	W. S. W.	.922	84.2	82.3	69.8	Ditto...	...	...
	.070	74.0	76.0	73.5	S. W. ...	.019	81.5	84.9	72.3	S. S. W.	.904	87.0	86.0	68.0	S. ..	.913	82.6	80.5	64.5	Ditto...	...	...
	.027	76.6	79.8	74.4	Ditto. ...	29.972	83.0	85.0	72.8	S. ...	.865	86.4	85.8	71.3	S. S. W.	.865	82.0	80.5	67.0	Ditto...	...	...
	29.978	77.2	80.2	74.4	Ditto. ...	.934	83.6	85.3	72.8	Ditto. ...	.818	87.0	86.6	73.4	S. ..	.846	83.0	81.4	73.2	Ditto...	...	...
	.888	78.0	80.6	75.2	S. S. W.	.852	84.0	85.5	76.0	S. W. ..	.709	86.8	86.3	78.3	Ditto. ...	.713	83.3	82.2	76.0	S. S. W.	...	...
☽	.906	78.0	81.0	68.3	W. N. W.	.851	83.4	85.0	69.0	W. N. W.	.757	88.5	89.0	70.2	S. W. ...	.771	85.8	84.2	70.3	S. S. E.	...	...
	.957	78.3	81.0	72.0	N. N. E.	.920	83.8	86.0	69.0	N. N. W.	.818	88.7	89.4	60.7	N. W...	.840	86.0	84.0	71.5	W. N. W.	...	...
	.980	77.0	79.3	74.8	W. N. W.	.936	82.8	85.0	72.9	S. W. ..	.849	89.0	90.0	70.0	W. ...	.858	86.0	84.4	73.2	W. ...	...	...
	30.019	73.6	76.7	68.6		29.971	80.3	82.7	68.5		29.872	85.7	85.7	68.5		29.878	82.2	80.6	69.5		00.0	0.00
	30.014	72.9	74.8	67.3		29.971	77.0	78.8	68.3		29.884	80.4	80.0	68.0		29.896	78.0	76.6	68.4		22.1	2.41

These Observations have been made for the most part with a supply of new and first-rate Instruments, r[illegible]
into the Observatory, by orders of the Bengal Government, a brief description of the Instruments seems necessary.

Barometer by Troughton, used prior to the 1st June, 1844. Observations reduced to 32° Fah. = 29.493
" by Col. Everest, used from 1st June to 31st August, 1844, .. Ditto .. = 29.687
No. 52. Standard Barometer by Newman, used from 1st Sept., 1844, .. Ditto .. = 29.654
[illegible] .. Ditto .. = 29.667

[illegible] *ffice, Calcutta, for the Month of March,* 85[illegible]

Days of the Month	Moon's Phases	Observed at 9 H 50 M					Observations made at Apparent Noon					Observed at 4 P M					Observations made at Sunset					Rain Gauges	
		Barometer reduced to 32 Fahrenheit	Temperature			Wind	Barometer reduced to 32 Fahrenheit	Temperature			Wind	Barometer reduced to 32 Fahrenheit	Temperature			Wind	Barometer reduced to 32 Fahrenheit	Temperature			Wind	Elevation	
																						Feet 60.	Feet 5.
			Of the Mercury	Of the Air	Of Wet Bulb	Direction at 9 h 50 m		Of the Mercury	Of the Air	Of Wet Bulb	Direction at Noon		Of the Mercury	Of the Air	Of Wet Bulb	Direction at 4 P M		Of the Mercury	Of the Air	Of Wet Bulb	Direction at Sunset	Upper	Lower
		Inches	°	°	°		Inches	°	°	°		Inches	°	°	°		Inches	°	°	°		Inches	Inches
1		29 971	7[illegible] 7	81 2	76 4	S W .	29 927	85 3	87 4	76 6	S	29 827	90 3	90 4	77 8	S.	29 837	86 4	84 8	77 2	S		..
2		.881	80 4	82 6	75 4	S S W	851	86 6	89 0	76 4	S S W	.758	89 8	89 3	76 [illegible]	Ditto	724	85 7	84 0	76 4	S sharp	1 29	1 36
3		905	79 0	81 8	77 6	Ditto .	866	84 0	85 [illegible]	73 2	W N W	762	88 7	89 2	73 0	S W	762	86 3	84 6	76 4	W	..	..
4		930	79 4	80 8	64 0	N N E	913	82 [illegible]	82 4	64 4	N	819	85 [illegible]	85 2	6[illegible] 2	W S W	829	83 4	82 0	67 0	N N.W		..
5	⊙	30 017	77 4	80.0	63 3	N .	972	83 2	84 6	63 6	N N W	863	87 3	8[illegible] 5	6[illegible] 0	S W	873	84 6	8[illegible] 8	66 2	S		..
6		.008	76 3	79 3	74 2	W ..	964	82 4	85 0	70 [illegible]	N W	861	87 4	87 0	68 0	S	859	84 8	83 8	70 8	Ditto		..
7		29 954	79 5	81 4	75 4	W S W	928	83 0	84 6	75 6	S W	848	87 0	87 4	76 3	W	862	85 3	84 4	75 6	W	.	..
8		30 025	78 3	80 6	63 4	N W .	979	81 8	83 5	63 3	N W	876	86.2	86 9	65 0	N W	888	84 0	81 9	65 5	S ...	..	.
9		29 993	77 9	80 4	72 2	W.	947	83 3	85 6	67 4	Ditto .	843	88 5	89 0	67 4	W S W	832	86 0	84 0	67 9	Ditto		..
[illegible]		938	77 0	78 8	75 4	Ditto .	868	83 2	84 6	76 0	S .	764	88 6	89 3	69 4	S S W	734	87 0	85 0	71 2	S E		..
1		920	79 5	81 7	76 3	Ditto .	882	84 7	86 6	74 1	W S W	786	90 6	91 3	71 2	W	804	87 7	86 6	73 2	Ditto .		..
2	☾	973	81 9	83 7	75 3	S W .	914	86 2	87 0	77 7	S .	843	87 3	87 2	76 4	S S W	848	83 8	83 0	75 8	S		..
3		883	81 3	83 2	76 0	S S W	835	86 4	87 6	77 2	Ditto ..	757	83 7	82 6	76 4	S	816	80 8	79 7	76 7	S W	0 19	0 96
48		877	76 7	79 9	75 4	S S E	.824	83 5	84 9	75 9	Ditto ..	685	86 [illegible]	84 4	76 3	Ditto	746	82 0	78 9	73 0	N N W	0 40	0 46
[illegible]		.924	70 8	71 6	68 3	E S E	898	7[illegible] 6	78 0	71 4	S E	814	82 4	8[illegible] 0	72 9	Ditto	8[illegible]5	80 0	78 3	7[illegible] 4	S .		..
[illegible]		955	79 0	80 6	75 4	W S W	921	83 4	85 4	77 3	S ..	829	87 4	87 0	77 4	S S E	837	83 4	82 4	75.7	S S W		..
[illegible]		.963	78 8	80 2	76 3	S W .	904	83 3	84	77 2	S W	797	87 3	8[illegible] 4	75 5	S.	785	84 4	83 0	75 0	S	0 74	0 74
[illegible]		885	78 4	81 0	76 1	W S W	871	83 4	85 [illegible]	7[illegible] 9	Ditto	.762	84 7	84 0	7[illegible] 3	S L	810	76 4	74 6	70 8	N.	0 12	0 14
[illegible]	●	.892	78 0	79.8	76 4	S E ..	867	78 5	77 6	73 0	Ditto ..	783	83 4	83 5	75 2	S W	836	76 5	75 2	70 6	N. W ..	0 05	0 05
[illegible]		960	77 0	79 4	74 0	S ..	.923	81 8	83 0	74 0	Ditto	805	82 9	80 2	72 8	S .	803	77 0	76 2	70 7	S ...	0 71	0 74
18		930	71 3	73 0	69 0	W S W	.908	76 4	78 2	7[illegible] 0	W S W	809	82 8	83 0	72 6	S W	8[illegible] 6	81 0	79 4	72 4	S W	0 05	0 06
		.952	72 0	73 0	69 2	Ditto .	918	76 9	79 0	72 0	W	814	82 0	81 6	71 6	S W ..	809	79 0	78 3	73 0	S	..	.
		927	76 6	78 8	72 0	S W .	895	81.5	83 0	72 4	S W ..	781	85 5	85 4	75 6	S S W	818	81 2	79 0	72 7	Ditto	0.05	0 05
		888	79 3	81 8	75 3	S S W	848	83 3	84 2	76 2	S S W	771	83 0	80 6	7[illegible] 4	S	855	73 0	71 0	69 4	Ditto	0.46	0 50
		896	75 0	76 9	71 4	W N W	.858	78 6	79 5	7[illegible] 2	N W. ..	758	83 4	83 9	73 6	N W	748	81 3	80 2	74 0	S E	1 25	1 25
		815	71.0	72 0	69 0	S S E	787	75 3	76 3	71 0	S W ..	681	77 2	77 0	70 3	W S W	685	77 8	76 4	71 9	S	0 43	0,47
		.690	72 2	73 2	67 3	N W ..	6[illegible]7	74.3	75.0	66 1	N W. ..	999	78 0	77 4	66 4	N W	630	76 2	75 0	65 6	N W .	.	..
S	☽	.837	74.0	75 4	65 5	W .	808	78 0	79 0	65 6	W N W	744	82 0	81 8	66 2	W.S W	747	79 8	78 0	69 0	S		..
		.821	77.6	80 0	71 4	W S W	777	83 2	85 0	70 0	S W	679	88 4	88 8	69 6	S W ..	685	84 0	81 8	71 0	Ditto	..	..
		787	80 0	82 5	75 6	S S W	696	86 4	88 0	75 5	Ditto. ..	.628	91 2	90 6	77 8	S	633	86 2	84 4	77 4	Ditto ..		..
		819	81.6	82 3	77 4	W	756	87 1	89 2	77 0	E. .. .	704	91 0	91 6	76 8	W	704	86 6	85 0	78 4	N E		..
n,		29 909	77 3	79.2	72 6		29 870	82 0	83 5	73 0		29 776	85 8	85 6	72 5		9 789	82 3	80 8	7[illegible] 4		5 74	6 08
}		29,955	79.8	82 5	72 8		29,913	86 2	88,3	72 9		29,812	91 3	91 6	72 8		29 816	87 5	85 7	73 4		1 00	1 05

These Observations have been made for the most part with a supply of new and first rate Instruments received [illegible] the Observatory, by orders of the Bengal Government, a brief description of the Instruments seems necessary

Barometer by Troughton used prior to the [illegible] at [illegible]

	Moon's Phases.	Observed at 9 H 50 M.					Observations made at Apparent Noon					Observed at 4 P M.					Observations made at Sunset.					Rain Gauges.	
		Barometer reduced to 32° Fahrenheit	Temperature.			Wind	Barometer reduced to 32° Fahrenheit.	Temperature			Wind	Barometer reduced to 32° Fahrenheit	Temperature.			Wind	Barometer reduced to 32° Fahrenheit.	Temperature.			Wind.	Elevation.	
			Of the Mercury.	Of the Air.	Of Wet Bulb	Direction at 9 h. 50 m.		Of the Mercury.	Of the Air	Of Wet Bulb	Direction at Noon.		Of the Mercury	Of the Air.	Of Wet Bulb.	Direction at 4 p m		Of the Mercury.	Of the Air.	Of Wet Bulb	Direction at Sunset.	Feet. 60 Upper	Feet. 5. Lower.
		Inches	°	°	°		Inches.	°	°	°		Inches	°	°	°		Inches	°	°	°		Inches	Inches
		29 830	78.0	79.0	71.8	N.	29.825	84 4	85.6	73.6	W	29.724	90 2	90 5	76.4	S.	29 722	87 5	86 2	77 2	S. W	...	...
		.814	79 4	81.3	75.2	W.N W	.782	85 2	87 0	78 4	Ditto.	.670	91 8	93 0	75 2	N.	674	89 6	88 0	76 0	S.	...	...
		.824	83 4	84 4	78.3	W.	.796	87 3	88 4	79 2	Ditto	667	93 0	94 0	76.9	W.	706	90 0	88 5	75 4	N.	0 26	0.28
S.	⊙	.900	80 2	82 2	72.6	Ditto.	.861	84 4	85 0	73.6	W N. W	.762	89 9	90 0	76 0	S. W.	.763	87 4	85 7	77 0	S.	...	...
		.952	81.4	84 0	76.0	N. W.	.918	86 7	88 4	75 8	Ditto	810	91 6	92 2	75 6	E.	.508	83 4	87 4	78.4	S W.	...	...
		.934	82.8	85 0	78.6	S. W.	.903	88 0	90.0	78 5	S. S. W.	811	91 9	92 6	77 3	W.	.407	88 8	88.0	78 6	S S W	...	...
		.896	82 3	84.5	73 0	W.	.857	89.6	92 0	70 2	S. W.	.764	94 6	95 2	69 3	W. N W.	.761	90 4	88.3	76 2	S.	...	...
		.868	82 3	85.4	74 0	S. W.	.842	90 6	93 6	69 4	S.	.763	95 2	95 6	71 8	S W.	.756	92 5	89 7	74 5	S E.	...	...
		.861	84 4	86 2	74 7	W.	.825	89 2	91 2	74.6	W	723	95 0	95 4	74 0	W	722	92.4	90 9	78.7	S. S. W.	...	...
		.862	85.5	87 4	78 3	N. E	.841	91 0	93.6	78 3	S. E.	751	95 0	96 9	78 3	N. N. W	.759	93 0	91 3	78 5	N. W.	...	...
1S.	☾	.887	85.3	87.6	76.6	S. W.	.854	90.2	92 0	75 4	W.	754	94 7	95 0	78 5	S. W.	.743	92 0	90 4	78 3	S. W.	...	...
		.904	84 0	85 0	71.2	W.	.873	88 0	89 5	73 6	S.	.7[illegible]	92.6	94 0	75 6	S.	782	90 3	88 2	74 4	S.	...	...
		.944	86 0	88 3	77.0	S. W.	.911	90 8	93 0	77.2	Ditto.	.784	95 3	95 4	77 4	Ditto	.787	92 6	92 0	76 9	Ditto	...	...
		.926	85.9	88 0	79 0	S. S. W	.902	91.7	94.0	76 5	W.	785	96 0	95 3	70 3	Ditto	808	90 0	87.5	75 6	Ditto.	...	...
5		.935	86.4	89 0	78.9	S.	.905	91 7	92.8	75 6	S. W.	.791	96 0	96.3	77.0	S. W.	.793	91 8	89.7	70 2	S. S. W.	...	...
		.895	86 5	89.2	78.6	S. W.	.835	91.7	93.7	76.5	Ditto.	729	96.0	95 2	76 3	W.	728	92 4	90 3	75 3	S.	...	...
7		.858	86 8	89.0	78.2	S. S W.	.814	92 4	93 0	78 2	S.	690	95.5	95 5	77.4	S.	717	89 7	87.4	75.6	Ditto.	...	...
8S		.854	86 3	88 6	80.4	Ditto.	.814	90 6	92.2	81 4	Ditto.	.708	93 9	93 8	79.5	Ditto.	718	89 4	88 0	80 2	Ditto	...	...
9	●	.830	86.7	88 4	81 0	S.	.777	92.0	93 8	81 6	S. S. W.	.654	95.2	94 6	83 3	Ditto.	658	90 8	89 0	81 9	Ditto.	...	...
0		.758	87 0	89 6	82 6	S. W.	.708	93 2	95 4	82 6	S.	.590	95 8	97 6	82 [illegible]	Ditto.	611	91 0	88.0	76 4	S. E.	...	...
1		.708	88 0	90.0	81.5	S.	.673	92.6	94.2	83.2	Ditto.	.554	95 7	97 4	82 2	Ditto	574	89.0	87.0	79 6	S.	...	...
2		.652	88 0	89 6	81 0	Ditto.	.635	91 7	93 0	82 4	Ditto	570	92 8	92 2	81 4	Ditto.	.535	87 8	86 6	80 4	Ditto.	...	...
3		.749	86.0	88 4	81.3	S. E.	.708	91 8	94.6	81 6	S. E.	638	91 2	90 4	80 4	Ditto	.655	87 4	86 8	80.0	Ditto	0 06	0.08
4		884	87.0	88 4	78.4	W.	.778	90.3	91.0	79 2	W	681	92 4	93 4	78 6	S. S W.	686	88 2	87 4	78 0	Ditto	...	...
5S.		.836	87.0	89.2	81 3	S.	.787	91 4	93 3	82 8	S.	.656	93.4	93 0	79 6	S.	676	89 0	87 4	80 2	Ditto.	...	...
6		.863	83.6	86 5	77.3	S. S. W.	.585	90.3	93 0	78 3	S. S. W	721	91 6	91 0	81.8	S. W.	.734	86 5	85 6	78 8	Ditto.	0.30	0.32
7	☽	.781	84 4	86 5	78 0	Ditto.	.738	89 5	91 8	79 4	S.	.646	94 0	93 0	85 0	S.	.5[illegible]0	89 0	86 8	79 4	Ditto.	...	...
8		727	86 0	88 6	75 4	S. W.	.696	91.6	93 4	76 0	W	.591	95 5	95.4	77.9	Ditto	.573	91.0	88 4	74 0	Ditto	...	...
9		.747	88 6	91 0	81.4	S.	.712	92.9	94 4	82 6	S. W.	.584	93 0	92 0	83 4	Ditto	.6[illegible]	87 4	86 6	81 6	S.	1.11	1 16
0		.800	85 0	86 8	80.4	Ditto	.781	86.2	87.5	81 2	S. S W.	673	90 2	93.1	77 6	S. S W	666	86.4	84 6	74 0	S. S. W.	...	...
an,		29.841	84.8	86 9	77.8		29.806	89.9	91.7	77.9		29 700	93.7	93.6	77.6		29 708	89 8	88 1	77 4		1 73	1 84
e g t		29.821	85.5	87.6	79 2		29.784	90.6	92.2	80 2		29.681	93.3	92.9	79 4		29 696	88 3	87.3	76.5		3 50	3.75

These Observations have been made for the most part with a supply of new and first-rate Instruments, re

to the Observatory, by orders of the Bengal Government, a brief description of the Instruments seems necessary.

rometer by Troughton, used prior to the 1st June, 1844. Observations reduced to 32° Fah. = 29.498

Month of May, 1852.

Days of the Month	Moon's Phases.	Observed at 9 H. 50 M.					Observations made at Apparent Noon.					Observed at 4 P. M					Observations made at Sun-set					Rain Gauges. Elevation.	
		Barometer reduced to 32 Fahrenheit.	Temperature. Of the Mercury.	Temperature. Of the Air.	Temperature. Of Wet Bulb.	Wind. Direction at 9 h. 50 m.	Barometer reduced to 32 Fahrenheit.	Temperature. Of the Mercury.	Temperature. Of the Air.	Temperature. Of Wet Bulb	Wind Direction at Noon.	Barometer reduced to 32 Fahrenheit	Temperature Of the Mercury	Temperature Of the Air.	Temperature Of Wet Bulb	Wind Direction at 4 p. m	Barometer reduced to 32 Fahrenheit	Temperature Of the Mercury.	Temperature Of the Air.	Temperature Of Wet Bulb	Wind. Direction at Sunset.	Feet 60. Upper.	Feet 5. Lower.
		Inches.	o	o	o		Inches.	o	o	o		Inches.	o	o	o		Inches	o	o	o		Inches	Inches
1		29 769	86 0	88 2	79 4	S. ..	29 719	90 4	91.4	81.8	S. W. ..	29.611	92 3	91 6	80.4	S.	23.598	88.4	87.3	80.6	S.	1.56	1.56
2S.		.775	85.3	87 0	81.0	S. W. ..	.739	90.4	91.8	81 5	Ditto. ..	.654	92.2	92.7	82 0	Ditto. ..	.667	90.0	88.4	81.8	Ditto. ...	...	...
3	⊙	.814	87 2	89 0	79 4	Ditto. ..	.779	92.0	93 4	80 8	W.	685	95.4	96.5	80.0	W. N. W.	.661	92.4	91 0	80.8	Ditto. ..	...	...
4		.808	88 0	91.2	82.0	S. ..	.781	91.7	92.0	82.0	S S. L	.695	91 6	92.0	82.0	S.	.716	88.0	87 0	78 3	N. E. ..	...	...
5		.809	87.3	88 4	77 5	Ditto ..	.789	90.4	91.2	79.0	S. W. ..	.732	89 8	89 8	79 6	Ditto	.605	83.6	82 3	76.3	Ditto. ..	0.06	0 06
6		.831	78.8	79 6	75.3	N. ..	.808	82.0	83 3	77 0	N. N. E	.691	86 2	86 4	77 8	N N. E	.684	84.5	84.0	76 8	E. N. E.	...	...
7		.799	82 4	83 8	77.3	S S. W.	.765	84.6	85.0	76.6	S. W. ..	.626	89.0	89 6	78 0	S.	.650	87.3	85.7	78 3	S.	...	...
8		.740	86.8	88.4	80 8	Ditto. ..	.690	91 2	92 8	81 8	S. .	.573	91.0	89 7	78.5	Ditto ..	.691	80 2	77.2	74 4	W.	0.19	0.21
9S		.682	88 0	89.4	82 8	S ..	.629	91.0	92.0	83.0	S. S. W	.556	93.0	92 8	81.6	Ditto.	.565	89.3	86.0	81 8	S.	...	...
10	☽	.641	87 0	88 2	82 3	S. sharp	.586	90 4	91.4	83.5	S. sharp	522	92.0	91.2	82.4	S sharp	.571	87.7	86.9	80 8	Ditto ..	...	...
11		.680	89.0	90.2	82 0	Ditto ..	.662	91 8	92 8	82.0	Ditto. ..	.561	92 4	91.3	81.4	Ditto .	606	88 3	87.5	78.2	Ditto. ..	...	...
2		.719	89.2	90.7	81 2	S. S E.	.681	92 3	94.0	80.2	S. E. ..	.566	94 2	94.0	81.6	S. S. E.	618	90.8	89 5	79 6	Ditto. ..	...	...
3		.633	87.2	88 0	81 5	E. [a gl	.666	91.0	92 4	81 2	S E [a gl	.568	91.3	91 0	79.8	E. [a gl	.578	84.4	82.8	79.3	E. N. E	0.10	0.10
4		.549	83 8	85.2	78 4	N. E. Bl.	.484	86.8	87.2	77 8	ENE. bl.	.362	80.5	79 4	77.2	N E. Bl	.312	78 8	78.8	76.5	N E. b. g	7.64	8.40
5		.425	77.0	77 0	75.8	W high	.481	80.6	83 0	78 2	S W. ..	483	84 5	85.7	77 6	S. W. ..	.534	83.6	83.3	79.4	S. W. ..	...	...
6S.		.730	87.8	89 4	83 0	S. ...	.680	91.3	92.4	84 4	S ..	.595	92.5	92.4	84 0	S	.594	89 0	88.0	83.0	S.	...	...
7		.708	88.0	89.0	82.6	Ditto. ..	.703	90 2	91 0	83 6	S. S. E.	624	91.2	91.0	83.4	Ditto ..	.657	88 5	87 6	82 6	S. S. E	0.10	0.12
8	●	.737	87 6	89.3	83.3	Ditto...	.710	90.2	91	84 2	S. E. ..	.639	91 2	91 5	83.3	S. S. E	.642	87.3	86 4	82 0	Ditto. ..	...	...
9		.748	82 2	85.3	79 8	E.	.694	89 2	90 6	83.0	Ditto. ...	.591	90.8	90.6	82 4	E. . .	640	84 4	80.8	76 6	N. E. ...	0.28	0.30
0		.723	82 8	84 4	79 3	N. N. E.	.687	87 0	89.0	81.3	Ditto. ..	587	91.0	91.5	82 3	S. E ...	.579	88 0	86.8	80 2	S.	0 18	0.20
1		.699	85.5	86 0	81.6	W N.W.	.653	88.6	90 0	82 0	N. W. ..	.571	91 6	92 0	81.0	N. W. ...	.544	89 0	88 0	81.0	N W. ..	0.92	0 94
2		.709	81 6	84 8	79 2	N. E. ..	.658	87 3	89.0	83.0	S. W. ..	.592	91 3	91 8	83 2	W.	.604	88.2	88.2	83 1	S. W. ..	...	...
3S.		.712	86.4	88.7	80.4	S. W. ..	.692	91.3	92.8	81.5	Ditto. ...	.619	93 6	94.2	81.2	S.	.629	90 6	89 7	81.7	S.	...	...
4		.782	88.0	90.2	83.3	Ditto. ..	.733	91.8	93.4	83.0	S. ...	·661	94.5	95 0	82.0	Ditto. ...	652	91.0	90.0	82 8	Ditto. ..	...	...
5		.762	88.2	90.0	83 7	S. .	.718	92 3	94.2	84 9	Ditto. ..	.621	96 2	97 4	83 0	S. W ..	.605	93.6	92 7	83 0	S. W. ...	...	...
6	☾	.701	90 0	92.7	84 0	S . W ..	.676	94 7	96.8	80 3	W. ...	.580	98.0	99 0	79.7	W.N.W.	.572	95.0	93.7	81.0	W.	...	...
7		.668	89.6	93.4	76 2	Ditto. ...	.641	94.6	96.3	78 0	N W. ..	.555	97.2	98.2	78.0	N. W. ..	.577	93.8	92.8	81 4	N. W. ..	...	...
8		.696	91 3	93.4	79.6	W N. W.	.667	94 4	97 6	73.8	W. N W	.563	97.0	98.3	74 6	W.N.W.	.557	94 0	93.0	78.8	W.N.W.	...	...
9		.677	88.4	92.0	78.2	N. W. ...	.640	95.2	97.4	76.4	W. ..	.535	98.7	99.7	76.2	W ..	.546	95.0	94 0	79.0	S. W. ..	...	...
0S		.666	90.4	93.2	79.5	S. W. ..	.686	95.0	97.3	79.0	S.	.546	99.0	100 4	76 3	S. W. ..	555	95.6	93.8	80.8	Ditto. ..	...	...
1		.744	91 0	92 8	84 6	S. ...	.725	94 3	95.4	83.0	S. S. E	.629	97.6	98.0	84 0	S.	.634	93 5	92.0	83.0	S.	...	...
an,		29 715	.865	88.0	80.5		29.683	90.5	91.9	80.9		29.594	92.5	92.7	80.5		29 610	88.8	87.7	80.1		11.03	11.89
e g t		29 693	90 0	92.1	82.3		29.661	94.7	96.5	82.6		29.565	97 4	97.8	81.6		29 580	92.4	90.7	81.4		0.05	0 08

These Observations have been made for the most part with a supply of new and first-rate Instruments, received
the Observatory, by orders of the Bengal Government, a brief description of the Instruments seems necessary.

	Moon's Phases.	Observed at 9 H 50 M					Observations made at Apparent Noon.					Observed at 4 P M					Observations made at Sunset.					Rain Gauges.	
		Barometer reduced to 32 Fahrenheit	Temperature			Wind	Barometer reduced to 32 Fahrenheit.	Temperature			Wind.	Barometer reduced to 32 Fahrenheit	Temperature.			Wind.	Barometer reduced to 32° Fahrenheit.	Temperature.			Wind.	Elevation.	
			Of the Mercury.	Of the Air.	Of Wet Bulb	Direction at 9 h 50′m.		Of the Mercury.	Of the Air	Of Wet Bulb	Direction at Noon.		Of the Mercury	Of the Air.	Of Wet Bulb.	Direction at 4 p. m		Of the Mercury.	Of the Air.	Of Wet Bulb	Direction at Sunset.	Feet. 60 Upper	Feet. 5. Lower.
		Inches	o	o	o		Inches.	o	o	o		Inches	o	o	o		Inches.	o	o	o		Inches	Inches
1		29.830	78.0	79.0	71.8	N.	29.825	84.4	85.6	73.6	W	29.724	90.2	90.8	76.4	S.	29.722	87.6	86.2	77.2	S. W.	...	...
2		.814	79.4	81.3	75.2	W. N. W.	.782	85.2	87.0	76.4	Ditto.	.670	91.8	93.0	75.2	N.	.672	89.6	88.0	76.0	S.	...	...
3		.824	83.4	84.4	76.5	W.	.796	87.3	88.4	79.2	Ditto.	.667	93.0	94.0	76.9	W.	.706	90.0	88.5	75.4	N.	0.26	0.28
4S.	☉	.900	80.2	82.2	72.6	Ditto.	.861	84.4	85.0	73.6	W. N. W.	.762	89.9	90.0	76.9	S. W.	.763	87.4	85.7	77.0	S.	...	...
5		.952	81.4	84.0	76.0	N. W.	.916	86.7	88.4	75.8	Ditto	.800	91.6	92.2	75.6	E.	.809	89.4	87.4	78.4	S. W.	...	...
6		.934	82.8	85.0	78.6	S. W.	.903	88.0	91.0	78.5	S. S. W.	.811	91.9	92.6	77.3	W.	.807	88.6	88.0	78.6	S. S. W.	...	...
7		.896	82.3	84.5	73.0	W.	.857	89.6	92.0	70.2	S. W.	.764	94.6	95.2	69.3	W. N. W.	.769	90.4	88.3	76.2	S.	...	...
8		.888	82.3	85.4	74.0	S. W.	.842	90.6	93.6	69.4	S.	.763	95.2	95.6	71.8	S. W.	.756	92.5	89.7	74.5	S. E.	...	...
9		.861	84.4	86.2	74.7	W.	.825	89.2	91.2	74.6	W.	.723	95.0	95.4	74.0	W.	.722	92.4	90.9	78.7	S. S. W.	...	...
0		.862	85.3	87.4	78.3	N. E.	.541	91.0	93.6	78.3	N. E.	.751	97.0	97.9	78.3	N. N. W.	.750	93.0	91.3	78.5	N. W.	...	...
1S.	☾	.887	85.3	87.6	76.6	S. W.	.854	90.2	92.0	75.4	W.	.734	94.7	95.0	75.5	S. W.	.743	92.0	90.4	78.3	S. W.	...	...
2		.904	83.0	85.0	71.2	W.	.873	88.0	89.5	73.6	S.	.765	92.6	94.0	75.6	S.	.782	90.3	88.2	74.4	S.	...	...
3		.944	86.0	88.3	77.0	S. W.	.911	90.8	93.0	77.2	Ditto.	.784	95.3	95.4	77.4	Ditto.	.787	92.6	92.0	76.9	Ditto	...	...
4		.926	85.9	88.0	79.0	S. S. W.	.902	91.7	94.0	76.5	W.	.755	96.0	95.3	70.3	Ditto	.808	90.0	87.5	75.6	Ditto.	...	...
5		.935	86.4	89.0	78.9	S.	.905	91.7	92.2	75.6	S. W.	.791	96.0	96.3	77.0	S. W.	.793	91.8	89.7	70.2	S. S. W.	...	...
6		.895	86.5	89.2	78.6	S. W.	.835	91.7	93.7	76.5	Ditto.	.729	96.0	96.2	78.3	W.	.728	92.4	90.3	75.3	S.	...	...
7		.858	86.8	89.0	78.2	S. S. W.	.814	92.4	95.0	78.2	S.	.690	95.5	95.5	77.4	S.	.717	89.7	87.4	75.6	Ditto.	...	...
8S.		.854	86.3	88.6	80.4	Ditto.	.814	90.6	92.3	81.4	Ditto.	.708	93.9	93.8	79.5	Ditto.	.718	89.4	88.0	80.2	Ditto.	...	...
9	●	.830	86.7	88.4	81.0	S.	.777	92.0	93.8	81.6	S. S. W.	.654	95.2	94.6	83.3	Ditto.	.658	90.8	89.0	81.9	Ditto.	...	...
0		.755	87.0	89.6	82.6	S. W.	.705	93.2	95.4	82.6	S.	.590	95.8	95.6	82.2	Ditto.	.610	91.0	88.0	76.4	S. E.	...	...
1		.708	88.0	90.0	81.8	S.	.673	92.6	94.2	83.2	Ditto	.554	95.7	97.4	82.2	Ditto	.574	89.0	87.0	79.6	S.	...	...
2		.652	88.0	89.6	81.0	Ditto.	.635	91.7	93.0	82.4	Ditto	.570	92.8	92.2	81.4	Ditto.	.535	87.8	86.6	80.4	Ditto.	...	...
3		.749	86.0	88.4	81.3	S. E.	.708	91.8	93.6	81.6	S. E.	.635	91.2	90.4	80.4	Ditto	.655	87.4	86.8	80.0	Ditto	0.06	0.08
4		.884	87.0	86.4	78.4	W.	.778	90.3	91.0	79.2	W.	.681	92.4	93.4	75.6	S. S. W.	.686	88.2	87.4	78.0	Ditto	...	...
5S.		.846	87.0	89.2	81.3	S.	.787	91.4	93.3	82.8	S.	.656	93.4	93.0	79.6	S.	.676	89.0	87.4	80.2	Ditto.	...	...
6		.863	83.6	86.5	77.3	S. S. W.	.825	90.3	93.0	78.3	S. S. W.	.721	91.6	91.0	80.8	S. W.	.734	86.5	85.6	78.8	Ditto.	0.30	0.32
7	☽	.781	84.4	86.5	78.0	Ditto.	.738	89.5	91.8	79.4	S.	.646	94.0	93.0	83.0	S.	.640	89.0	86.6	79.4	Ditto.	...	...
8		.727	86.0	88.6	75.4	S. W.	.696	91.6	93.4	78.0	W.	.591	95.5	95.4	77.9	Ditto	.573	91.0	88.4	74.0	Ditto	...	...
9		.747	88.8	91.0	81.4	S.	.712	92.9	94.4	82.6	S. W.	.584	93.0	92.0	83.4	Ditto.	.622	87.4	86.6	81.6	N.	1.11	1.16
0		.800	85.0	86.8	80.4	Ditto	.781	86.2	87.5	81.2	S. S. W.	.673	90.2	90.3	77.6	S. S. W.	.666	86.4	84.6	74.0	S. S. W.	...	...
an,		29.841	84.8	86.9	77.6		29.806	89.9	91.7	77.9		29.700	93.7	93.8	77.8		29.708	89.8	88.1	77.4		1.73	1.84
t		29.881	85.5	87.6	79.2		29.784	90.6	92.2	80.2		29.681	93.3	92.9	79.4		29.696	88.9	87.3	78.5		3.50	3.75

These Observations have been made for the most part with a supply of new and first-rate Instruments, re
to the Observatory, by orders of the Bengal Government, a brief description of the Instruments seems necessary.

Barometer by Troughton, used prior to the 1st June, 1844 Observations reduced to 32° Fah. = 29.493

[illegible] Ditto = 29.637

Days of the Month	Moon's Phases.	Observed at 9 H. 50 M.					Observations made at Apparent Noon.					Observed at 4 P. M					Observations made at Sunset					Rain Gauges	
			Temperature.			Wind.		Temperature.			Wind		Temperature			Wind.		Temperature			Wind.	Elevation.	
																						Feet 60.	Feet. 5.
		Barometer reduced to 32 Fahrenheit.	Of the Mercury	Of the Air.	Of Wet Bulb	Direction at 9 h. 50 m.	Barometer reduced to 32 Fahrenheit.	Of the Mercury.	Of the Air.	Of Wet Bulb	Direction at Noon.	Barometer reduced to 32 Fahrenheit	Of the Mercury	Of the Air.	Of Wet Bulb	Direction at 4 p. m.	Barometer reduced to 32 Fahrenheit	Of the Mercury.	Of the Air.	Of Wet Bulb	Direction at Sunset.	Upper.	Lower.
		Inches.	o	o	o		Inches.	o	o	o		Inches.	o	o	o		Inches.	o	o	o		Inches	Inches
1		29.769	86 0	88 2	79 4	S. ..	29.719	90 4	91.4	81.8	S. W. ..	29.611	92 3	91 6	80.4	S.	29.598	88.4	87.3	80 6	S.	1.56	1.56
2S		.775	85.3	87 0	81.0	S. W. ..	.739	90.4	91.8	81 5	Ditto. ..	.654	92.2	92.7	82 0	Ditto. ..	.667	90.0	88.4	81.8	Ditto. ...	..	...
3	⊙	.814	87 2	89 0	79 4	Ditto. ..	.779	92.0	93 4	80 8	W. .	685	97 4	96.5	80.0	W. N.W.	.681	92.4	91 0	80.8	Ditto. ..	..	...
4		.808	88 0	92.2	82.0	S. ..	.781	91.7	92.0	82.0	S. S. E	.695	91 6	92.0	82.0	S.	.716	88.0	87 0	78 3	N E. ..	...	...
5		.809	87.3	88 4	77 5	Ditto ..	.789	90.4	91.2	79.0	S W. ..	.732	89 8	89 8	74 6	Ditto. .	.805	83.6	82 3	76.3	Ditto.	0 06	0 06
6		.731	78.8	79 8	75.3	N. ..	.808	82.0	83 3	77 0	N. N. E.	.691	86 2	86 4	77 8	N N. E	.684	84.5	84.0	76.8	E. N. E.	...	...
7		.799	82 4	83 8	77.3	S. S. W.	.765	84.6	85.0	76.6	S. W. ..	.626	89 0	89 6	78 0	S.	.650	87.3	85.7	78 3	S.	...	..
8		.740	86.5	88.4	80 8	Ditto. ..	.690	91 2	92 8	81 8	S. ..	.573	91.0	89 7	78.8	Ditto ..	.691	80 2	77.2	74 4	W.	0.19	0 21
9S.		.652	88 0	89.4	82 5	S ..	.621	91.0	92.0	83.0	S. S. W	.556	93 0	92.8	81.6	Ditto. .	.565	89.3	88.0	81 8	S.	...	...
0	☽	.641	87 0	88 2	82 3	S. sharp	586	90 4	91.4	83.5	S. sharp	522	92.0	91.2	82.4	S sharp	.571	87.7	86.9	80 8	Ditto ..	...	...
1		.650	89.0	90 2	82 0	Ditto ..	.662	91 8	92 8	82.0	Ditto. ..	.561	92 4	91.3	81.4	Ditto. .	606	88.3	87.5	78.2	Ditto. ..	...	...
2		.719	89.2	90 7	81.2	S. S E.	.681	92 3	94.0	80.2	S. E. ..	.566	94 2	94.0	81.6	S. S. E.	618	90.8	89 5	79 6	Ditto. ..	..	...
3		.693	87.2	88 0	81 5	E.[a gl	.666	91.0	92 4	81 2	S E [a gl	.566	91.3	91 0	79.8	E. [a gl	578	84.4	82.8	79.3	E. N. E	0.10	0.10
4		.549	83 8	85.2	78.4	N. E. Bl.	.484	86.8	87.2	77 8	ENE. bl.	.362	80.8	79 4	77.2	N.E. Bl	.312	78 8	78.8	76.5	N E.b.g	7.64	8 40
5		.425	77.0	77 0	75.8	W high	.481	80 6	83 0	78 2	S. W. ..	.489	84.5	85.7	77 8	S. W. ..	.534	83.6	83.3	79.4	S W. ..	...	...
3S		.740	87.8	89 4	83 0	S. ...	.689	91.3	92.4	84 4	S ..	.595	92.5	92.4	84 0	S.	.594	89.0	88.0	83.0	S.	...	..
7		.708	88 0	89.0	82.6	Ditto. ..	.703	90 2	91.0	83 6	S. S. E.	624	91.2	91.0	83.4	Ditto. ..	.657	88 5	87.6	82 6	S S. E	0.10	0.12
3	●	.737	87 6	89.3	83.3	Ditto. ...	.710	90.2	91 .	84.2	S. E. ..	.640	91 2	91 5	83.3	S. S. E	.642	87.3	86.4	82 0	Ditto. ..	..	.
		.748	82 2	85.3	79 8	E.	.694	89 2	90 6	83.0	Ditto. ...	.591	90 8	90.6	82.4	E. .. .	640	84 4	80.8	76 6	N. E. ..	0.28	0.30
		.723	82 8	84 4	79 3	N. N.E.	.657	87.0	89.0	81.3	Ditto. ..	.587	91.0	91.5	82 3	S. E ...	.579	88 0	86.8	80 2	S. ...	0 18	0.20
1		.699	85.5	86 0	81.6	W N.W.	.653	88.6	90 0	82 0	N. W. ..	.571	91 6	92 0	81.0	N. W. ...	.584	89 0	88 0	81.0	N W. ..	0.92	0 94
		.709	81 6	84 8	79 2	N. E. ...	.658	87 3	89.0	83.0	S. W. ..	.592	91 3	91.8	83.2	W.	.604	88.2	88.2	83 1	S W. .	...	..
4S.		.712	86.4	88.7	80.4	S. W. ..	.692	91.3	92.8	81.5	Ditto. ...	.619	93.6	94.2	81.2	S.	649	90 6	89 7	81.7	S.	...	...
		.782	88.0	90.2	83.3	Ditto. ..	.733	91 8	93 4	83.0	S. ...	.661	94.5	95 0	82.0	Ditto. ...	652	91.0	90.0	82 8	Ditto. ..	...	...
		.762	88.2	90.0	83 7	S. .	.718	92 3	94.2	84 9	Ditto. ..	.621	96.2	97 4	83 0	S. W ..	.605	93.6	92 7	83.0	S. W. ...	...	...
	☾	.701	90 0	92.7	84 0	S . W ..	676	94 7	96.8	80 3	W.	.580	98.0	99 0	79.7	W.N.W.	.572	95.0	93.7	81.0	W.	...	...
		.668	89.6	93.4	76 2	Ditto. ...	.641	94.6	96.3	78 0	N. W. ..	.555	97.2	98.2	78.0	N. W....	.577	93.8	92.8	81 4	N. W. ..	...	...
		.696	91 3	93.4	79.6	W N. W.	.667	94 4	97 6	73.8	W. N W	.563	97.0	98.3	74 6	W.N.W.	.557	94 0	93.0	78.8	W. N. W.	...	...
		.677	88.4	92.0	78.2	N. W. ...	.640	95 2	97.4	76.4	W. ..	.535	98.7	99.7	76.2	W. ..	.546	95.0	94 0	79.0	S. W. ..	...	..
S		.666	90.4	93.2	79.5	S. W. ..	.686	95.0	97.3	79.0	S.	.546	99.0	100 4	76 3	S. W. ..	555	95.6	94.8	80.8	Ditto. ..	...	...
		.744	91.0	92 8	84 6	S. ...	.725	94 3	95.4	83.0	S. S. E	.629	97.6	98.0	84 0	S.	.634	93 5	92.0	83.0	S.	..	...
n.		29 715	.865	88.0	80.5		29 683	90.5	91.9	80.9		29.594	92.5	92.7	80.5		29 610	88.8	87.7	80.1		11 03	11.89
}		29 693	90 0	92.1	82.3		29.661	94.7	96.5	82.6		29.565	97 4	97.3	81.6		29 580	92.4	90.7	81 4		0.05	0 08

These Observations have been made for the most part with a supply of new and first-rate Instruments, receive[illegible]
the Observatory, by orders of the Bengal Government, a brief description of the Instruments seems necessary.

Barometer by Troughton, used prior to the [illegible]

		Observed at 9 h 50 m.					Observations made at Apparent Noon.					Observed at 4 p. m					Observations made at Sunset.					Rain Gauges.	
	Moon's Phases.	Barometer reduced to 32° Fahrenheit.	Temperature.			Wind.	Barometer reduced to 32° Fahrenheit.	Temperature.			Wind.	Barometer reduced to 32° Fahrenheit.	Temperature.			Wind.	Barometer reduced to 32° Fahrenheit.	Temperature.			Wind.	Elevation.	
			Of the Mercury.	Of the Air.	Of Wet Bulb.	Direction at 9 h. 50 m.		Of the Mercury.	Of the Air	Of Wet Bulb	Direction at Noon.		Of the Mercury	Of the Air.	Of Wet Bulb.	Direction at 4 p m		Of the Mercury.	Of the Air.	Of Wet Bulb.	Direction at sunset.	Feet. 60 Upper.	Feet. 5. Lower.
		Inches	°	°	°		Inches.	°	°	°		Inches.	°	°	°		Inches	°	°	°		Inches	Inches
1		29.812	89.2	91.6	83.5	S. W. ...	29.788	93.0	94.0	84.5	S. E. ...	29.706	95.0	95.0	83.7	E. ..	29.692	92.3	90.3	82.5	S. E. ..		
2	⊙	.774	88.1	90.2	83.5	S. ...	.674	92.5	93.6	85.5	S. S. E.	.641	93.9	94.1	84.2	S. ..	.593	90.0	88.5	82.6	Ditto. ..	0.66	0.68
3		.682	89.8	92.5	84.5	Ditto. ...	.645	93.3	94.5	86.5	S. ..	.550	95.5	95.9	85.6	S. E. ..	.517	91.5	91.0	84.5	Ditto	...	...
4		.642	91.2	93.0	86.1	S. E ..	.623	94.9	96.0	88.0	S. E. ..	.522	96.0	95.9	87.9	S. S. E.	.499	92.8	92.6	86.0	S. S. E.	...	...
5		.624	90.7	92.1	85.9	S. ..	.617	94.0	95.1	87.0	S. ..	.502	96.1	96.5	86.2	S.	.512	96.0	93.4	77.5	S. E. .	...	...
6S.		.643	90.3	93.0	84.6	S. S. E.	.621	90.5	94.5	85.6	S. E. ..	.552	93.4	93.5	83.5	Ditto. ..	.547	90.3	89.6	83.3	S.		
7		.611	90.0	90.9	83.7	S. ...	.564	92.9	93.8	84.2	S. ..	.466	94.0	93.8	85.1	Ditto ..	.480	90.2	89.5	83.6	Ditto ..	0.56	0.60
8		.583	81.3	84.6	79.0	Ditto. ..	.563	87.0	88.0	81.4	S. E ..	.538	88.9	89.3	80.4	Ditto. .	.549	87.3	86.6	81.0	Ditto. .	0.07	0.08
9	☾	.689	85.8	88.0	81.0	S. E. ..	.652	90.4	91.7	82.6	S ..	.559	94.0	94.4	83.3	Ditto. ..	.572	92.0	91.0	83.2	Ditto.		
0		.674	89.2	90.4	84.0	S. ...	.643	92.5	93.8	82.8	Ditto. ...	.547	94.0	94.4	83.0	Ditto	.598	88.0	85.6	80.4	N. E. ..	0.27	0.30
1		.649	85.4	86.0	82.4	Ditto. ..	.616	83.2	82.0	79.6	Ditto. ..	.553	87.0	88.3	83.2	Ditto. .	.571	86.5	85.9	81.3	S ..		...
2		.628	88.0	89.6	82.4	Ditto. .	.595	91.2	92.5	82.2	Ditto. ..	.507	94.0	94.2	81.3	S. S. W	.566	82.8	80.7	78.5	S. E.	0.45	0.46
3S.		.663	85.8	87.3	83.9	S. S. W	.653	85.4	83.4	80.4	S. E. ..	.571	84.0	85.0	81.0	S. E.	.582	85.3	85.0	81.3	S. S. E.		
4		.682	86.4	87.0	81.6	N. .	.620	89.6	90.9	81.9	N. ..	.523	84.7	85.2	82.4	S. S. W.	.563	84.2	84.2	81.4	S.	1.77	1.82
5		.611	82.2	81.0	79.7	S. S. E.	.513	79.6	79.4	78.4	S. S. E.	.467	82.2	82.1	79.6	S. E. .	.477	82.2	82.0	80.4	E. ..	0.22	0.24
6	●	.529	80.6	81.0	80.2	S. E. ..	.524	83.0	83.7	81.8	E. S. E	.447	87.4	87.2	82.6	Ditto. ..	.473	85.0	84.8	81.5	S. E. ..	0.53	0.55
7		.566	80.6	80.0	81.4	Ditto ..	.566	83.0	83.0	81.3	S. E. ..	.484	87.1	86.0	81.4	Ditto .	.531	84.0	84.0	81.8	Ditto. ..	0.52	0.59
8		.613	84.2	86.4	83.2	Ditto. ..	.586	88.4	90.0	85.0	Ditto. ..	.537	84.0	84.3	81.7	S. S. E	.546	84.4	84.5	83.0	S ..	...	...
9		.603	87.2	87.8	82.8	S. S. E.	.582	89.6	90.6	84.4	S. W. ..	.510	85.6	85.6	83.6	S. ..	.545	86.8	86.3	82.4	Ditto. ..	...	...
0S.		.574	87.5	88.6	83.4	Ditto. ..	.541	90.4	91.0	83.5	S. E. ..	.451	91.8	91.2	82.4	S. E. ..	.502	88.4	87.3	81.4	S. E. ..		
1		.555	87.0	89.0	82.8	E. S. E.	.511	90.2	90.5	83.5	E. N. E.	.405	90.0	90.9	84.2	N. E. ..	.434	88.5	88.0	82.2	E. .	0.72	0.74
2		.520	86.1	87.5	82.3	E. N. E	.461	89.6	88.0	82.0	Ditto. ..	.413	87.8	88.1	82.4	E .	.472	85.4	84.8	81.6	E. N. E.	0.07	0.09
3		.554	85.4	86.8	81.9	N. E. ..	.521	88.0	88.9	82.8	N. E. ..	.468	90.6	90.2	81.4	E. S. E.	.504	86.5	86.2	81.0	S. E. ..		
4		.527	87.2	88.7	82.6	E. S. E.	.497	90.3	91.0	83.0	E. S. E.	.420	86.4	87.0	83.3	S. E. ...	.446	86.3	85.8	82.8	S. W. .	0.75	0.81
5	☽	.477	84.3	84.6	81.4	N. ..	.434	85.6	86.2	81.5	N.	.356	85.6	84.4	82.0	S. ..	.384	85.0	85.2	82.9	S .	0.21	0.24
6		.450	85.5	87.0	82.6	E. N. E.	.409	88.4	88.6	83.2	E. N. E.	.331	86.6	86.0	83.3	S. E. ..	.377	86.6	86.1	82.1	S. S. E.	0.32	0.37
7S.		.490	84.0	84.4	81.8	S. E. ..	.479	85.0	85.0	81.8	S. E. .	.415	88.0	87.5	81.9	S. ..	.455	85.0	84.0	80.0	S. ..	0.44	0.50
8		.573	83.3	82.3	79.8	S. ...	.548	83.7	83.4	80.4	S. S. E.	.405	86.2	84.3	82.0	Ditto .	.491	84.8	84.0	81.3	Ditto. ..	0.27	0.34
9		.579	83.3	84.8	81.2	Ditto. ...	.552	86.2	86.3	81.2	S. S. W.	.498	84.0	83.8	81.0	Ditto. ..	.516	83.0	83.2	80.0	Ditto. ..	0.15	0.18
0		.608	82.4	83.3	81.0	Ditto. ...	.607	83.4	83.8	81.4	S. S. E.	.520	82.9	83.2	81.2	S. E. .	.559	83.3	83.4	81.3	S. S. E.	...	...
an,		29.606	86.1	87.3	82.5		29.574	88.5	89.1	82.9		29.497	89.3	89.3	82.8		29.518	87.1	86.5	81.8		7.98	8.59
[illegible]		29.580	86.6	88.1	82.1		29.557	89.5	90.2	82.3		29.490	88.5	88.1	81.5		29.501	85.9	85.2	80.3		7.47	8.39

These Observations have been made for the most part with a supply of new and first-rate Instruments, re
ito the Observatory, by orders of the Bengal Government, a brief description of the Instruments seems necessary.

Barometer by Troughton, used prior to the 1st June, 1844. Observations reduced to 32° Fah. = 29.498

Universal Assurance Society for Lives,

EMPOWERED BY SPECIAL ACT OF PARLIAMENT.

ESTABLISHED IN LONDON AND CALCUTTA, 1834.

Capital £500,000 in 5,000 Shares of £100 each.

Indian Branch.

DIRECTORS.

C. R. Prinsep, Esq.	W. Grey, Esq.
W. H. Smoult, Esq.	James Norman, Esq.
George Barton, Esq	

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TREASURERS.	SOLICITORS.
Bank of Bengal.	Messrs. Sandes & Watts.

AGENTS AND SECRETARIES.

Messrs. Braddon and Co.

MADRAS.	BOMBAY.
Agents.	*Agents.*
Messrs. Bainbridge and Co.	Messrs. Leckie and Co.

ADVANTAGES OFFERED BY THIS SOCIETY.

1.—The profits are declared in each year on the second Wednesday in May, from which date all Persons who may have assured for the whole term of life, on the participating scale, and on whose Policies six complete annual or twelve complete half-yearly original premiums have been paid, are entitled to participate in the profits of succeeding years in either of the modes provided by the Deed of Settlement, viz. by a reduction of the annual or half yearly premiums as they fall due, or by an equivalent addition to the sum assured by way of a Bonus. Each Assurer on his first becoming entitled to participate in the profits has the option of selecting either of the foregoing methods, and three months from the date of declaration of the profits is allowed for his making that selection, which, however, when once determined on, cannot be altered in after years.

2.—One-fifth of the ascertained profits is divided between the Policy-holders and Shareholders,—three-fourths to the former, and one-fourth to the latter—the remaining four-fifths are set apart to enter into the average to be struck on the next succeeding year.

3.—The following table will show the operation of the reduction allowed by the division of profits for 1852, which is equivalent to 45 per cent. on the current annual premium of all Policies entitled to participation.

Age next birthday when Policy was issued.	Date of Policy previous to the 2nd Wednesday.	Sum Assured.	Original Premium.	Reduction.	Annual Premium payable after deduction.
		Co.'s Rs.	Co.'s Rs.	Co.'s Rs.	Co.'s Rs.
20	May, 1847	10,000	420	189 0 0	231 0 0
30	„	10,000	480	216 0 0	264 0 0
40	„	10,000	590	265 8 0	324 8 0
50	„	10,000	740	333 0 0	407 0 0
60	„	10,000	1,030	463 8 0	566 8 0

4.—From the foregoing explanations it will be seen that the benefits arising from a participation in the profits are actually experienced (when a reduction of the premium is selected) at the periods when the seventh annual or thirteenth and fourteenth half-yearly premiums fall due. In the case, however, of a Bonus to the sum assured being selected, an equivalent sum will be added to the Policy for the current year, being such an amount as the reduction in the premium would purchase as a single payment.

5.—Separate tables for Assurances without participation in profits, both Civil and Military, have been adopted for the whole of Life, at reduced rates, for such persons as may prefer a lower rate of premium to participation in the general profits.

6.—In all cases of return of the Assured to Europe for a *permanent residence*, they will be entitled in paying their future *annual* premiums to fall back on the English rates for the age at which they originally assured without reference to the number of payments made in India.

7.—Parties visiting England on *Furlough*, or for a *temporary residence*, will be required to pay the Indian premium during residence in England, without reference to the number of years the same may previously have been paid in India.

8.—In all cases of reduction to the English rate, the Policies are to be subject to all the regulations and conditions affecting English Policies.

9.—When application is made for assuring a life subject to more than ordinary hazard, an augmented premium will be charged proportionate to the increased risk, the rate of which will be regulated by the strictest attention to justice between the Society and the Assured, according to circumstances.

10.—The Parent Institution being in London, with a similar establishment in Calcutta, for granting Policies, premiums as well as claims are payable in either country at the option of the Policy-holder. The appointment of Sub-Committees at Madras and Bombay, with power to grant Policies affords similar facilities to persons residing at either of the sister Presidencies.

11.—All Policies becoming claims on the Society will be discharged within three months after satisfactory proof of the death, and cause of death, of the Assured shall have been furnished to the Directors either in London or Calcutta.

12.—The Directors of the Indian Branch of the Society are empowered to treat for the purchase of Policies for the whole term of Life on which premium shall have been paid for a period of not less than five years, or to advance, if required, on such Policies, by way of loan, two-thirds of the estimated value.

13.—All applications for Assurance must be accompanied by a Medical Fee of eight rupees.

14.—The Tables, Blank Forms, and other particulars, requisite to enable persons to effect Assurances, may be had on application to the Agents.

By Order of the Directors,

BRADDON AND CO., *Agents and Secys.*

Calcutta : September, 1852.

A List of Terrestrial and Epiphytical Orchids found in Assam and the neighbouring Hills.

No.				
1		Oberonia iridifolia,	Epi.	Hills.
2		—— species,	Ditto,	Ditto.
3	*	Liparis bracteata,	Ditto,	U. A
4	**	—— concinna,	Ditto,	Ditto.
5	**	—— anceps,	Ditto,	Ditto.
6	*	—— cylindrostachya,	Ditto,	Ditto
7		—— longipes,	Ditto,	Ditto
8		Otochilus fuscus,	Ditto,	Ditto
9		—— species,	Ditto,	Ditto.
10		Pholidota imbricata,	Ditto,	Ditto
11		—— undulata,	Ditto,	Ditto
12	*	—— articulata,	Ditto,	Ditto
13	*	—— 3 species, (new)	Ditto,	Ditto
14		Cœlogyne flavida,	Ditto,	Ditto
15		—— undulata,	Ditto,	Ditto
16	**	—— fimbrita,	Ditto,	Ditto.
17	**	—— barbata,	Ditto,	Ditto
18	*	—— longicaulis,	Ditto,	Ditto.
19	**	—— procera,	Ditto,	Ditto.
20		—— cristata,	Ditto,	Ditto.
21	**	—— rigida.	Ditto,	Ditto
22	*	—— Wallichiana,	Ditto,	Ditto
23		—— praecox,	Ditto,	Ditto
24	**	—— maculata,	Ditto,	Ditto
25		—— prolifera,	Ditto,	Ditto
26	*	—— nitida,	Ditto,	Ditto
27	*	—— ocellata,	Ditto,	Ditto
28	**	—— media,	Ditto,	Ditto
29	**	—— elata,	Ditto,	Ditto
30		—— ovalis,	Ditto,	Ditto
31	**	—— Gardneriana,	Ditto,	Ditto
32	**	Trichasma suavis,	Ditto,	Ditto
33	*	Bolbophyllum umbellatum,	Ditto,	Ditto
34	**	—— Careyanium,	Ditto.	Ditto
35	*	—— flexuosum,	Ditto.	Ditto
36	*	—— Jenkinsii,	Ditto,	Ditto
37	*	Cirrhopetalum cœspitosum,	Ditto,	Ditto
38	*	—— cornutum,	Ditto,	Ditto
39		—— macrophyllum,	Ditto,	Ditto.
40	**	Trias,	Ditto,	Ditto
41	*	Eria paniculata,	Ditto,	Ditto
42		—— flava,	Ditto,	Ditto
43	**	—— pussilla,	Ditto,	Ditto.
44	**	—— densiflora,	Ditto,	Ditto.
45	**	—— clavicaulis,	Ditto,	Ditto.
46	**	—— planicaulis,	Ditto,	Ditto
47		—— ferruginea,	Ditto,	Ditto
48	**	Eria convallaroides,	Epi.	Hills.
49	**	—— spec fl. large, rose colored,	Ditto,	Ditto.
		Aporum anceps,	Ditto,	plains
51	*	—— Jenkinsii,	Ditto,	Ditto.
52		—— ancinaciforme,	Ditto,	Hills,
53		Dendrobium Pieradi,	Ditto,	plains
54	**	—— heterocarpum, m	Ditto,	Hills.
55	*	—— Paxtonii,	Ditto,	Ditto.
56	*	—— fimbriatum,	Ditto.	Ditto.
57	*	—— longicornu,	Ditto.	Ditto.
58	*	—— formosum,	Ditto,	Ditto.
59	**	—— intermedium, Nov. spec.,	Ditto.	Ditto.
60	**	—— pulchellum,	Ditto,	Ditto.
61	**	—— Nov species,	Ditto.	Ditto.
62		—— calceolus,	Ditto.	Ditto.
63	*	—— densiflorum	Ditto,	Ditto.
51	**	—— sulcatum,	Ditto.	Ditto.
65	**	—— bicameratum,	Ditto.	Ditto.
66	*	—— Jenkinsii,	Ditto,	Ditto.
67		—— cœrulescens,	Ditto.	Ditto.
68		—— nobile,	Ditto.	Ditto.
69	*	—— Gibsonii,	Ditto,	Ditto.
70	**	—— candidum,	Ditto,	Ditto.
71	**	—— stuposum,	Ditto,	Ditto.
72	*	—— Cambridgeanum,	Ditto,	Ditto
73	**	—— clavatum,	Ditto,	Ditto.
74	**	—— Dalhousianum,	Ditto,	Ditto.
75	**	—— Devonianum,	Ditto,	Ditto.
76	**	—— Farmerii,	Ditto,	Ditto.
77	**	—— Griffithii,	Ditto,	Ditto.
78	**	—— transparens,	Ditto,	Ditto.
	**	—— densiflorum pallidum,	Ditto,	Ditto.
80	**	—— Do. like above, but rose colored,	Ditto,	Ditto.
81	*	—— multicaule,	Ditto,	Ditto.
82	**	—— amœnum,	Ditto,	Ditto.
83	**	Spathoglottis pubescens,	Ter.	Ditto.
84		Arundina bambusifolia,	Do.	do. & plains
85	*	Phaius grandifolius,	Ditto,	Ditto.
86		—— Wallichi,	Ditto,	Ditto.
87	*	—— albus,	Ditto,	Ditto

No.				
88	**	Phaius maculatus, ..	Ter	Hls.& plains
89	*	Apaturia senilis, ..	Ditto,	plains
90	*	Eulophia virens, ..	Ditto,	Ditto
91		Vanda teres, ..	Ditto,	Ditto
92		——— cristata, ..	Ditto,	Hills.
93		Nov. Spec. yellow, streaked with brown, ..	Ditto,	Ditto
94		——— Ditto, dull purple, ...	Ditto,	Ditto.
9		Camarotis purpurea,	Ditto,	Ditto
96	*	Micropera pallida, ..	Ditto,	Do. & plai
97		Saccolabium retusum, ...	Ditto,	plains
98		———— micranthum, ...	Ditto,	Hills.
99	**	———— rigidum,	Ditto,	Ditto
100	**	———— carinatum, ...	Ditto,	Ditto
101	**	————calceolare,	Ditto,	Ditto.
102	**	————curvifolium, ...	Ditto,	Ditto.
103	**	Sarcanthus juncens,	Ditto,	plains
104	**	———— affinis, ..	Ditto,	Ditto.
105	**	———— oxyphyllus, ...	Epi.	Ditto.
106	*	Agrostophyllum Khasyanum, ..	Ditto,	Hills.
107	*	Œeceoclades ampullacea, ...	Ditto,	Ditto
108		Ærides affinè, ..	Ditto,	Do. & plains
109	*	————multiflorum,	Ditto,	plains
110	**	———— suaveolens,	Ditto,	Ditto.
111		————odoratum, ..	Ditto,	Ditto.
112	**	————refractum, ..	Ditto,	Ditto.
113	*	Xiphosium acuminatum.	Ditto,	Hills.
114	**	Acanthaphippium silhetense, ...	Ter.	plains
115	*	Cymbidium giganteum, ...	Epi.	Hills.
116	*	————lancifolium,	Ditto,	Ditto.
117		———— aloifolium,	Ditto,	plains
118		———— pendulum,	Ditto,	Ditto.
119		————Eburneum, Fl. very large, ..	Ditto,	Hills.
120	*	————inconspicuum, ...	Ditto,	Ditto.
121	*	———— longipetalum, ...	Ditto,	Ditto.
122		Euproboscis pygmœa,	Ditto,	Ditto.
123	*	Geodorum dilatatum,	Ter.	plains
124	*	———— candidum,	Ditto,	Ditto.
125	*	Calanthe densiflora, ..	Ditto,	Ditto.
126		Platanthera spece. ..	Ditto,	Ditto.
127		Peristylus elatus, ..	Ditto,	Ditto.
128		———— spec., ..	Ditto,	Ditto.
129	*	Habenaria ovigera, ..	Ditto,	Ditto.
130	**	———— 4 new species, ...	Ditto,	Ditto.
131	**	Pogonia, 2 species,	Ditto,	Ditto.
132	*	Cyrtosia, ...	Ditto,	Gowhatty.
133	*	Spiranthes, ...	Ditto,	Nowgong.
134		Zeuxine sulcata, ..	Ditto,	Ditto.
135	**	Anœctochilus Roxburghii, ...	Ditto.	Hills.
136	**	———— 2 new species, ...	Ditto,	Ditto.
137	**	Sypripedium venustum, ...	Ditto,	Ditto.
138	**	———— insigne,	Ditto,	Ditto.

N. B.—Plants not marked are common.

Ditto marked with an asterisk are found less frequently, and are consequently considered as somewhat rare.

Ditto with two asterisks are seldom brought in, and are consequently considered very rare.

Plants of large growth, such as Dendrobiums, &c. are generally in bunches, having from 5 to 10 stems, or more.

Middling sized ones, such as Ærides, Vanda, Saccolabiums, &c. have two or three stems twined together, and so form one plant.

The smaller ones with pseudo-bulbs, such as Cœlogne, Bulbophyllum, &c. have generally 10 to 20 stems or more growing together, and are considered as one plant.

The charges will be (£5) 50 Rupees for a box measuring 3 cubic feet, containing a variety of (1 or 2 of each species) 40 to 50 plants of the larger, or 50 to 80 of the middling and smaller, kinds, inclusive of package and freight to Calcutta.

If less than a box is taken, and the more rare required only—then the charges will be for a single plant of the common kind, (2 shillings) one Rupee. The rare and very rare in proportion. If any new plants, not discovered before, are sent, and which are not included in the list above, a separate charge will be made.

A liberal allowance made by the addition of more of the rare kinds, when more than two boxes are taken.

Apply to Messrs. Charles Cantor and Co., in Calcutta, who will receive orders for Orchids from Assam, and the Hills in the vicinity.

GOWHATTY: *May*, 1850.

THE JOURNAL

OF THE

Agricultural & Horticultural Society

OF

INDIA.

Notice regarding the Cotton Wool of China.

[Communicated by the Govt. of India.]

To the Secretary to the Agricultural
and Horticultural Society.

Home Dept. SIR,—I am directed to forward to you for submission to the Society the accompanying copy of a letter from the Secretary to Her Majesty's Plenipotentiary and Superintendent of Trade at Hong-Kong, No. 132, dated the 30th November last, together with the three samples of native cotton wool of China referred to therein.

I have, &c.,
A. R. YOUNG,
Under Secy. to Govt. of India.

COUNCIL CHAMBER:
The 28th January, 1853.

To C. ALLEN, ESQ.,
Secy. to the Govt. of India, Fort William.

SIR,—I am directed by His Excellency, Her Majesty's Plenipotentiary, &c., &c., to state for the information of the

Government of India, that he has received from the Shanghae district some Reports on the subject of the native cotton wool of China, which may be of assistance to you in judging whether the cotton of India is likely to compete with that of China in one of the principal fields of its growth, and I have herewith to enclose samples (*Nos*. 1 @ 3) which may enable you to form some estimate of the relative qualities.

The present price of the native cotton in the Shanghae market is *Sp. D.* 11⅓ per pecul of 133⅓ pounds, taking the dollar at 1,500 cash. But, from the large production of the last harvest, this is a low average price. The raw cottons of India are quoted at Canton at from 4 [illegible] 7 taels per pecul, by which it would appear that, at the exchange of 717 taels per *Sp. D.* 1,000, the best quality of India cotton is sold at about *Sp. D.* 9¾, which leaves a margin of more than *Sp. D.* 1½ per pecul. There is no doubt in China a great resistance to novelty in every shape, and the parties consulted say that to the comparative shortness of the staple and to the use of the hydraulic press in the packing of the cotton of India there would be many objections.

The Shanghae market is supplied from the following sources and in the proportions specified :—

Shanghae—proper,		.. .. ..	60	*p. ct.*
Do.	(N.)	Pookeaow, ...	4	,,
Do.	(S.)	Sanghwa, ...	10	,,
Do.	(E.)	Pootung, ...	50	,,
Do.	(W.)	Keating, ...	100	,,

the whole comprising 13 districts, and the average produce 3 peculs per mow, ($6\frac{61}{100}$ mow equal to the English acre,) but the whole growth cannot be accurately ascertained.

The peasantry bring their cotton to the Shanghae Hongs, for sale in quantities even of a few pounds. The last years Report is of,

	Peculs.	
Quantities arrived, Chuen Sha, ..	20,000	Peculs 1,16,000
Keating, ..	21,000	
Keaonnew, ..	15,000	
Shanghae, ..	60,000	
Distributed, to Fuhkien, cleaned, ..	9,000	64,000
Keangse, Do. ..	8,000	
Lae Yong, ,, ..	5,000	
Tsing Soo, ,, ..	2,000	
Consumed in Shanghae ,, ..	40,000	

The discrepancy is accounted for by the loss in cleaning.

The prices paid in the present month were :—

Shanghae (clean), cash	17,000 ⅌ pecul	Keating,	18,000
Do. uncleaned average,	4,000 ,,	Do. ..	5,500
Do. Do. good	5,000		

See samples forwarded herewith.

The cotton is packed for Keangse in bales of 150 catties
,, ,, Fuhkien ,, ,, ,, 110 do.

	Cash.	
Cost for Keangse, canvas-bag. ..	1,500	say 29,500 Cash.
,, Packing, cording, &c. ..	500	
,, Warehousing, ...	500	
,, Boat conveyance, ...	1,500	
,, Cost of 150 catties (clean),	25,500	

The expenses on cotton sent to Fuhkien are the same, except that the freight is 1,800 cash per bale, with a small export duty.

The planting of the cotton seeds takes place in the fourth month of the Chinese year;—the gathering in the eighth month. Twelve catties of seed are used per mow; the produce ought (as above) to average 3 peculs per mow, but there are districts that do not produce more than half this quantity. Bean-cake in solution is the general manure, a pecul of the cake costing 1,600 cash. The cotton plant is hardy; it thrives best in high self-drained lands; the seed is generally sown broad-cast, but sometimes it is sown three or four seeds in a hole. Four men, who are paid 250 cash each, sow a mow per day; the land must be weeded; the cotton is packed by women who are paid 100 cash per day.

Cotton is cleaned by iron rollers called kea-chays, which are found in almost every cottage. An industrious woman can clean 30 catties in a day, for which she earns 7 cash per catty. Cotton is whipped by the bow string, the operation is generally performed by old men and women, the former whipping 10, the latter 5, catties per day and earning 20 cash per catty. The spinning-wheel and the loom are generally also found in the dwellings of the peasantry. A wheel will turn off 8 to 9 taels per day at 10 cash per tael, and the average daily produce of a loom is 13 Chinese inches (nearly 10 English).

After reservation of a sufficient quantity of seed for the ensuing year's crop, the rest is crushed for oil; the stalks are employed for winter fuel.

His Excellency hopes to gather some additional information respecting the great marts for raw cotton on the Yang-tsze-keang, but there is much difficulty in obtaining even approximate statistics.

SUPERINTENDENCY OF TRADE, I have &c.,
HONG-KONG, 30*th Nov.* 1852. (Sd.) FRED. HARVEY.

To the Secretary to the Agricultural
and Horticultural Society.

Home Dept. *Revenue.* SIR,—In continuation of the letter of this department, No. 65, dated the 28th January last, I am directed to forward to you, for submission to the Society, copy of a further communication from the Secretary to Her Majesty's Plenipotentiary and Superintendent of Trade at Hong-Kong

No. 18, dated the 9th ultimo, together with the samples of native cotton wool referred to therein.

I have &c.,

COUNCIL CHAMBER, EDWARD THOMAS.
The 11th March, 1853. *Offg. Under-Secy. to Govt. of India,*

Extract from the Proceedings of the Most Noble the Governor General of India in Council, in the Foreign Department, under date the 8th March 1853.

FROM FREDERICK HARVEY, ESQ.,
H. M's. Plenipotentiary and Superintendent of Trade at Hong-Kong.

TO C. ALLEN, ESQ.,
Offg. Secy. to Govt. of India, Fort William.

SIR,—In continuation of the Report which I had the honor to send to you on the 30th Nov. last, by direction of His Excellency, Her Majesty's Plenipotentiary, &c., &c., for the information of the Government of India on the subject of cotton wool, the native growth of China, I have now the honor to forward to you extract (*No.* 1) of a Report His Excellency has just received from Mr. Vice-Consul Hayne of Ningpo, on the production, sale, and consumption of cotton in the province of Chekiang which, with the samples which accompany this, (*Nos.* 2 *@* 5) will throw some additional light on the comparative facilities enjoyed by India and China with reference to this very important article of commerce and manufacture.

SUPERINTENDENCY OF TRADE, I have &c.
HONG-KONG, *9th Feby.* 1853. (Sd.) FRED. HARVEY.

Extract of Mr. Vice-Consul Hayne's Report on the production, sale and consumption of cotton in Chekiang.

Production.—During the months of March and April the ground having been ploughed into ridges, cleaned of weeds, and the lumps pulverised, holes, 5 inches apart and in drills, are made with a dibble into which five or six seeds are placed; water is then poured, together with a quantity of liquid nanure on the seed, and the holes are covered up.

The ground is not irrigated, nor is the land ever allowed to lie fallow, but the same land is planted every consecutive year with cotton.

The cotton is gathered during the months of August and September, after which the ground is either sown with wheat or planted with vegetables. A mow of land will produce from 80 to 100 catties of cotton. It is difficult to ascertain what is the actual cost of production, but 2,500 cash may be considered a fair price. Cotton is grown in almost every part of the province of Chekiang, both in the plains and on the hills, but the former is considered the best. All the cotton brought to Ningpo is grown in Shavuhing, one of the three departments of this province, where upwards of 800,000 mows of land are under cultivation for this article. I am informed that 400,000 bales of cotton are annually imported into Ningpo from Seaon, Shan-heen and Yu Yaouheen in Shaon-hing-foo, and as each bale contains two peculs, the quantity of uncleaned cotton annually brought here will be 800,000 peculs, which, at this year's price, viz. 3 taels of silver per pecul, will amount to 2,400,000 taels, or say £ 600,000 sterling.

Mode of Sale.—Sometimes the Shaon-hing Cotton Hongs purchase the article and bring it to Ningpo for sale, sometimes the producers themselves bring it to Ningpo, and at other times the Ningpo Merchants go and purchase it at the place of production. The cotton is brought to Ningpo by water, and on its arrival is cleaned by hand machines, principally by women. The cost of cleaning is 2,000 copper cash per pecul. After it has been cleaned, it is re-packed. The bag into which it is packed is suspended from the ceiling of the building, and as the cotton is thrown into the bag, it is pressed down by a man with his feet. Each pecul or 100 catties of cotton, when cleaned, only leaves about 33 catties, and as the wholesale price this year of cleaned cotton is 7 taels of silver, or say 14,000 copper cash (£2-6-8), taking 100 catties in the rough state to be worth 3 taels of silver or 6,000 cash (£1-0-0), and adding to this the price for cleaning—2,000 copper cash (6*s.* 8*d.*),—this will leave 6,000 cash (£1-0-0) for loss in weight. The price of cotton has ruled at Ningpo during the last 10 years as follows:—

1843	Clean	20,000	Copper	Cash	per	Pecul
1844	,,	30,000	,,	,,	,,	,,
1845	,,	24,000	,,	,,	,,	,,
1846	,,	18,000	,,	,,	,,	,,
1847	,,	19,000	,,	,,	,,	,,
1848	,,	18,000	,,	,,	,,	,,
1849	,,	17,000	,,	,,	,,	,,
1850	,,	22,000	,,	,,	,,	,,
1851	,,	21,000	,,	,,	,,	,,
1852	,,	17,000	,,	,,	,,	,,

When prices have ruled high, cotton has been imported from Keaugnan, but, to my own knowledge, I cannot say whether the Indian cotton has ever been tried at Ningpo; although, I believe a small quantity was once or twice brought over here from Chusan during the time our troops were in the occupation of that island, but I have no data to go upon. I see no reason, however, why the East Indian cotton should not be brought into successful competition with the native cotton as it has been at Amoy, &c. The Indian staple is just as well suited for many purposes for which the Chinese use it as the native cotton; indeed a resident merchant (Mr. Davidson) informs me that in the autumn of 1850, when the price of cotton was likely to rule high, an offer was made to him to import a quantity from India. The price offered was remunerative, and Mr.

Davidson was only precluded from entering into a contract from the Chinese wishing the cotton to be delivered to them sooner than Mr. Davidson thought he could do so. I mention this circumstance to show that the Chinese must have been aware what sort of an article the Indian cotton was, and that they considered it would answer every purpose of the native cotton.

Consumption.—A large quantity of the cleaned cotton is exported to the provinces of Keongsoo, Szechnen, Hoopih and Fuhkien, and also to Taiechow and Winchow in this province. I am informed that only about 40,000 peculs of the Shaouking cotton is consumed at Ningpo, the remainder being re-exported, which I can readily believe, as a great deal is grown in the immediate neighbourhood of the city and which is used entirely for home consumption and manufacture; it is said, however, that both the Shaouking plant and cotton is superior to that grown at Ningpo.

I enclose for your Excellency's inspection samples of the Seaon-Shan and Yugaon Cotton, both in the uncleaned and cleaned state; they are both worth this year, in the uncleaned state, 3 taels of silver per pecul, and cleaned, 7 taels per pecul.

(True Extract)
(Signed) W. WOODGATE.

Remarks on the best mode of tapping the Caoutchuc Tree of Assam. *By* DR. FALCONER, *Supt. H. C. Bot. Garden.*

(Communicated by the Board of Revenue, Lower Provinces.)

1. Capt. Reynolds, having observed that several of the Caoutchuc Trees had been killed by over tapping, and others much damaged, in parts of the Assam forests where the tree abounds, was desirous of information as to the best mode of tapping for the guidance of grantees, and to enable him to

draw up suitable rules for the conservation of the trees, in the provisions of the contemplated pottahs.

2. Capt. Reynolds had deputed Mr. C. A. Bruce to examine the Chardooar Forests, where he had an opportunity of observing the effects of tapping, practised fourteen years ago, also of recent tapping, in Mr. Martin's grant, carried on about four months before his visit.

3. It would appear from the details contained in Capt. Reynolds's letter and its enclosure, that every part of the immense Caoutchuc trees of Assam, is laid under contribution for the milky juice, except the leaves. Incisions are not only made upon all parts of the trunk, and longer branches, and on the accessory supports, which have arisen from the descent of aerial roots, but tapping is largely practised upon the vast network of epigœous roots, which spread in such a remarkable manner, in this species, along the surface of the ground, half imbedded and half exposed. The incisions are stated to be about a span in length, and two or three inches in depth; in some cases not penetrating beyond the bark, in others extending into the sapwood. They are probably simple cuts effected by means of a dhau, or some other kind of hatchet, and they are made obliquely so as to cut across the course of the milky juice-vessels. From 40 to 50 incisions are made upon each tree.

4. The remarks which I have to offer will be directed to the two points upon which Capt. Reynolds desires information, viz., 1st. The best mode of tapping. 2d. The conservation of the trees.

5. The first point to determine is, what parts of the tree ought properly to be tapped, and what parts left intact. There can be no doubt about every portion of the stem, and branches that attain three or four inches in diameter, being suitable material for the operation, but I have serious doubts whether it is not injurious both to the tree and as regards the quality of the produce, when practised upon the roots.

The grounds of this misgiving are these. The milky juice, which coagulates into Caoutchuc, is the elaborated or descending sap, which acquires its peculiar properties during the course of circulation through the leaves. From these, it passes downwards through a series of proper vessels disposed among the liber fibres of the bark, from the branches to the trunk, and thence into the roots. This descending sap is in its highest state of elaboration, immediately after it has escaped from the leaves: as it passes downwards, portions of it are at every step appropriated for the growth of the different tissues of the tree, each assimilating that ingredient of the sap which it requires; and the consequence is, that the descending sap, when it enters the roots, is, to a certain extent, chemically different in its composition from the same fluid in the upper branches, besides a very considerable difference in the degree of inspissation.

6. The *Siphonia elastica* of South America, which yields the best Caoutchuc of commerce, is never, I believe, tapped in the roots. The same remark applies to the *Castilloa elastica*, yielding Pafantla Caoutchuc, and also to the *Urceola elastica* of the Straits and Sumatra. Root-tapping, in all probability, would never have been resorted to in the case of the Assam *Ficus elastica*, but for the facilities and irresistible temptations presented by the peculiar habit of roots in this species. They extend to a great distance horizontally, forming numerous anastomoses, and their upper surface exposed, while the lower is laid in the soil. An indolent juice-collector has, therefore, merely to dig pits at intervals under these roots, for the reception of earthen pots, and then to make a free incision, when the juice will drip copiously into the vessels without giving him further trouble. Had the roots of the *Ficus elastica* been subterraneous, in the ordinary manner of trees, root-tapping would, in all probability, never have been thought of.

7. When the East India Caoutchuc Company was established, about 14 or 15 years ago, it was found that the peculiar Caoutchuc properties were not durable, or persistent in the product of Assam, and that after a couple of years or more, there was a tendency to partial decomposition in the India Rubber, leading to more or less stickiness on the surface, and dimunition of elasticity. I was informed by one who had a large interest in the Company, that this defect was one of the principal reasons of their operations having been abandoned. It seems to me a fair question for investigation, whether this disrepute of Assam Caoutchuc may not have arisen from the general practice of root-tapping. The applications of the article have vastly increased since the extinction of that Company, more especially in the combinations of Caoutchuc with the Resins, Petroleum, Tar-oil, and other analogous substances, and the defects may be corrected by the admixture, so that Assam Caoutchuc, which would have fetched a low price only before, may be readily saleable now. But the subject is well worthy of the consideration of the grantees, viz., whether the commercial value of their produce is not injuriously affected by root-tapping.

8. I would not go the length, merely upon this theoretical inference, of advising that provisions should be made in framing the pottahs of the new grants against not tapping. The facilities and temptations to it are so great, where unsuperintended native agency is employed, in large uninhabited forests, that any prohibitory rules would necessarily be inoperative, and injunction simply would be useless. But the attention of grantees ought to be earnestly directed to the subject. A little care in the classification of the produce would, in a few years, settle the point satisfactorily, by keeping trunk and branch-tapped lots separate from the root-tapped lots, and noting whether there was any difference in the relative durability and persistence in quality

of the two. At present I am of opinion, that root-tapping is wholly unadvisable.

9. With regard to the mode of tapping, Capt. Reynolds inquires whether some better method could not be resorted to, and some instrument devised to drive into the trunk, branches and roots, so as to draw off the juice. Upon this I have to remark, that the milky juice is not contained in any distinct reservoir, which could be tapped by means of an aperture bored into it, but is distributed in a superficial layer in a vast number of minute tubular vessels, which are mainly confined to the inner or liber layer of the bark and the outermost layers of sapwood. Any boring process is therefore mechanically inapplicable to a structure of this nature, and probably no better method could be resorted to than the simple one now in practice of cutting superficial notches with a light hatchet, the incision to extend through the bark into the outer layers of the sapwood, but not into the hard wood. The notches should be oblique, and should extend as high up upon the loftier branches, as can be conveniently accomplished. They will probably be most advantageously made in a belt on one side each successive tapping, instead of inflicting them all round in a spiral manner. Capt. Reynolds seems to object to the existing method as practised by the Assamese, on the grounds that the vessels are severed by the direction in which the cut is made. But I do not think that there is any good practical objection in the case, as the milky juice vessels (laticiferous ducts) are not simple undivided tubes, but on the contrary have numerous branches, with anastomose-like veins, and thus are possessed of a net-work of lateral communications.

10. With regard to the preservation of the trees, the best injunction upon this important head, is not to endanger their vitality by excessive wounding. Forty or fifty incisions, at one time, are not too many for a large tree; but this num-

ber should not be exceeded, and the tapping should only be practised when the sap is flowing with activity. The best elaborated juice is produced at that time, and the remedial process of healing the wound is most speedily effected.

11. In South America the Caoutchuc trees are tapped in the rainy season. In Assam the tappings should never exceed two in the year: viz. once after the spring-crop of leaves is formed, when the sap is in great activity; and a second time early in the rains.

12. The last point requiring notice is to enjoin upon the grantees the advisability of tapping as high up, on the large branches, as they can persuade the natives to operate; in short, to abandon root-tapping in exchange for crown-tapping, which would appear to be little practised at present. If the natives could once be taught to distribute the tapping cuts discreetly over the larger and loftier branches, instead of limiting them as at present to the trunk, accessory stems, and roots, there would be little risk of the vitality of the trees being affected, and a constant supply of the juice would be yielded for very many years.

H. C. Botanic Garden, 20*th Nov.* 1852.

On the juice of the Mŭddār as a substitute for Gutta Percha.

Communicated by Capt. Meadows Taylor.

My Dear Sir,—I observe in the last number of the Society's Transactions that the Mŭddār, *Asclepia gigantea*, affords a very valuable kind of hemp or flax; and I have now the pleasure to communicate to you another valuable property it possesses, which has been lately discovered by a friend here, under whose permission I make the present communication to you.

Dr. Riddell, the Officiating Superintending Surgeon of the Nizam's Army, had for some time been employed in extracting or determining by chemical experiments the well-known medicinal properties of this plant, and during his investigations, having had occasion to collect the milky juice or sap and expose it to the air, found, as it gradually dried, that it became tough and hard, and not unlike Gutta Percha. This induced him to treat the juice as that of the Gutta Percha tree is done, and the result has been the obtaining of a substance apparently precisely analogous to Gutta Percha, of which I have the pleasure to send you a specimen bearing the impression of his seal, marked No. 1.

The mode of preparing this substance is as follows:—

The juice or sap to be collected by incision. An open slit may be made in the back of the plant and a pot tied to it, when it will flow into it; or it may be collected by cutting the back and catching as much as flows out at once. Dr. Riddell calculates that ten average-sized plants or bushes will yield as much juice as will make a pound of "Gutta Percha" substance, but it is not known *yet* how far the plant will bear tapping without injury, nor how often, or at what intervals, the extraction of juice might be made.

The juice extracted may either be exposed to the sun in a shallow vessel, or left to dry in the shade: by the former process, the substance becomes a little darker than by the latter.

When it has attained a tough consistency it may be well worked up in *very* hot water with a wooden kneader, or boiled: either process serves to remove an acrid property of the juice, as also all other matter but the "Gutta Percha" itself. It is believed that the more it is boiled and worked up, the harder it will eventually become when cool.

Comparison with the true Gutta Percha gives the following results.

Sulphuric acid—chars it.

Nitric acid—converts it into a yellow resinous substance.

Muriatic acid—has very little effect upon it.

Acetic acid—has no effect.
Alcohol—ditto.
Spirit of Turpentine—dissolves it into a viscid glue, which, when taken up between the finger and thumb pressed together and then separated, shews numberless minute and separate threads.

The above chemical tests correspond exactly with the established results of the real Gutta Percha.

The substance, however hard it may have become, becomes immediately flexible in hot water, and readily takes any form required, receiving and retaining impressions of seals, ornaments, &c. It has been made into small cups and other vessels which are not found to alter in form.

A test I suggested myself was, would it unite with Gutta Percha? and this was satisfactorily proved in my presence. A piece of the real Gutta Percha of similar size with a piece of the new substance was softened in hot water, and united readily; a specimen of this *mixture* is sent, marked No. 2.

The tests by acids on the mixed substance did not differ from those on either of the two original substances.

As there is no trouble attending the manufacture, and as I have no doubt the plant may be had near Calcutta, I have not sent more than a small specimen of that prepared by Dr. Riddell; and have no doubt that you, if you consider the subject worthy of attention, which it strikes me it is in an eminent degree, can readily prepare some of the new substance for any further experiments, chemical or otherwise, which you may consider necessary.

If the Mŭddār could be profitably grown for its hemp alone, it is evident, if this new substance proves in practice what it now appears to be, that an acre of cultivation of it would produce a large quantity of juice and thus materially enhance its value. The poorest land suffices for its growth, but I have no doubt that if cultivated and plentifully irrigated, not only would the yield of juice be larger, but the growth of the plant, and the fineness of its fibre when made into hemp materially increased.

Believe me, &c.,

HYDERABAD: MEADOWS TAYLOR.
2nd Nov. 1852.

Substitute for Gutta Percha.

(From the *Bombay Times* of 4th Nov., 1852.)

The following is a very interesting extract from a note from Dr. Riddell, containing an account of the experiments made by him on a substitute for Gutta Percha, which he believes he has discovered. The subject is most important, and if we can make a common hedge plant yield a product so valuable, and the demand for which is so certain quickly to out-run supply, a material addition will have been made to the productive resources of the country:—

" I have now the pleasure of sending you the result of my experiments on the juice of Mŭddār, and which I think will be found to assimilate closely with all the properties of Gutta Percha. A nearly similar substance is procurable from the juice of the milk-bush or hedge as it is called, the *Euphorbia tirucalli*, only when it hardens after boiling it becomes brittle; whilst warm it is as ductile as the other, and becomes hard quicker, without any of the peculiar scent of the *Asclepias gigantea* juice; it readily dissolves in spirits of turpentine, but is not affected in alcohol. As the juice is very acrid, and blisters the skin, giving most excruciating torture if the slightest particle gets into the eye, care must be taken in collecting it: however, a machine could easily be made for chopping up the boughs and expressing the juice, so that it need never be touched by the hands. The juice of that elegant plant of the same species, the *Poinsettia,* which has such a beautiful effect in the garden when the leaves turn scarlet, gives a similar substance, but does not harden when cool as the other, but still firm enough to be twisted, and would make a good varnish in a solvent like turpentine and then mixed with spirit. The plant grows readily *from cuttings, but requires water, which the other two do not.*

"As regards my experiments with the Mŭddār juice, they are as follows:—Having collected about 18 fluid ounces I had it strained through a cloth, and exposed 13½ ounces of it to solar evaporation on a flat dish. In three days it became firm, separating itself from the dish and easily removed. I then placed it in boiling water, and worked it well about with a spatula, and when cool enough to handle, kneaded it with my fingers: when cool I found it to weigh a little more than six ounces. I then boiled it, and, as it cooled, worked it well again; and on weighing the substance, found it had lost one ounce. It was then pulled out into shreds and boiled a second time, kneading it whilst cooling, and four ounces two drachms apothecaries' weight was obtained of what I call Mŭddār Gutta Percha.

"The next experiment was with four ounces of the juice, which weighed four ounces apothecaries' weight, and placing it in a bason, poured about one quart of boiling water on it, stirring it up and then leaving it to stand, when it broke into curds which fell to the bottom. I then partially poured off the fluid, and filtered the residue through paper, and on its being sufficiently dry to be removed found it to weigh one ounce six drachms. It was then worked well in hot water two or three times, and formed into a mass which gave six drachms, thus losing one ounce. On the whole it will be seen that the most economical method of preparing the juice, is by solar evaporation, the residue being nearly double to that of the second experiment.

"Result of the experiments in acids, alcohol liquor, potassæ, and spirits of turpentine, on equal quantities of the Mŭddār made into small pellets, immersed 48 hours.

"*Sulphuric Acid.*—Much charred, particularly outside. Cut a pellet in half, found the inside spotted, not charred, throughout; the remaining part stretching like tough dough.

"*Nitric Acid.*—Appeared converted into a yellow resinous substance and gained about one-third in weight, which it lost again when dry; found it pliable under pressure of the finger. When mixed with water it coloured it yellow.

"*Muriatic Acid.*—Coloured somewhat like the sulphuric but not so black, soft and plastic. No increase in weight. Colour brownish outside, with a reddish tinge inside.

"*Acetic Acid.*—No diminution in weight whatever; apparently the same as when first immersed.

"*Alcohol.*—The substance apparently softened, and lost a trifle in weight; spirit slightly discoloured.

"*Liquor Potassæ.*—Washed it in warm water and let it dry; has a yellowish tinge. Increased a little in weight, but become very ductile and adhesive.

"*Spirits of Turpentine.*—Placed one part in four of turpentine, and in 12 hours it was quite dissolved, forming a thick creamy substance; which, mixed with spirits of wine, would make a good varnish for silk or cloth."

R. RIDDELL.

Note on the fibre of Crotalaria tenuifolia, or "Jubbulpore hemp."

Among the various descriptions of fibrous substances which are noted in the official catalogue of the Great Exhibition of 1851, as having been received from India, specimens of "Jubbulpore hemp" from Messrs. W. H. Harton and Co., rope-manufacturers of Calcutta, are included. At a meeting of the Agricultural and Horticultural Society of India, held on the 12th June, 1852, Messrs. Harton and Co. submitted specimens of the same fibre, in a raw state, as also of fishing lines and tarred rigging made from it. A quantity of this raw material, procured from Jubbulpore by Messrs. Harton and Co. and the late Capt. Thompson about three years ago, was considered so well adapted for cordage purposes, owing to its excellent quality and great strength, that they have been willing to pay a high price for it to meet the heavy cost entailed by the transport of so bulky an article from Jubbulpore to Calcutta. In consequence of an impression on their part that the fibre in question was the produce of *Cannabis sativa,*—it being so similar in many respects to Russian hemp,—the subject was deemed by the Society deserving of further enquiry, not only on account of the superiority of the article itself, but to settle the very doubtful point whether *Cannabis sativa* could be grown to such perfection in the Nerbudda, in a climate and altitude differing so considerably from the natural *habitat* of the plant, viz. the Himalayan range. An application was accordingly made to Mr. Williams, Superintendent of the School of Industry at Jubbulpore, for a small quantity of seed, which was sown immediately on its receipt on the 23rd of June, 1852, in the Society's garden. In the course of nine weeks the seedlings had attained the height of 8½ feet *without branching,*—an important point in a fibrous yielding plant,—and commenced flowering in three months from the date of sowing. Dr. Falconer, to whom a specimen was referred, has pronounced it to be *Crotalaria tenuifolia* of Roxburgh, which Wight and Arnott, and some other Botanists, regard as merely a variety of *C. juncea,* the plant affording the well-known "Sunn hemp" of commerce; but their opinion, it may be observed, is founded on dried specimens: the habit differs very much from that of *C. juncea.*

Messrs. W. H. Harton and Co. have been kind enough to furnish the following memorandum regarding the above fibre:—

"This material has been tested several times in the Government service, both Military and Marine, and some ropes have been found equal to the staple cordage of Europe. A coil of bolt rope, manufactured by us from Jubbulpore hemp, tested last year in the Marine Department, broke with a strain of 57 cwt. A coil of the same size, taken from one of H. M. vessels, was tested shortly after, and broke with a strain of 59 cwt. It may observed that the hemp used in the naval yards of the British Government is all selected from the fleet of hemp-laden vessels, before any is permitted to be delivered to private parties. This Jubbulpore hemp can no doubt be considerably improved were the preparing process in the hands of Europeans, manufactured according to the Russian method, instead of being left, as at present, so entirely to the careless and ignorant natives."

The following extract from Mr. William's letter, dated Jubbulpore, the 19th Nov. 1852, will close this brief notice of a fibre which, no doubt, will be better appreciated when its merits become more generally known:—

"I am pleased to learn that the seed of the 'Jubbulpore hemp,' sent down by me in June last, has germinated so well in Calcutta. I can only grow it to advantage here along the ridges of the neighbouring hills, (where it attains the height of from 6 to 7 feet) that grown in the plains turning out weak in fibre when made into hemp. In a few weeks I will forward 3 seers of the seed by dák banghy; and, if you wish it, will send you down a large quantity of seed hereafter. I have lost considerably by sending this hemp down to Calcutta for sale, having had the misfortune to have had several boats burnt while going down the river; and the steamers decline taking a carriage of it, in consequence of its combustible nature. The native insurance offices at Mirzapore also object to insure it, except at such high rates as to prevent all chance of profit; so that if it could be cultivated along the banks of the river, I have no doubt but that in a few years it would turn out a profitable source of export. In addition to the risks of transit and cost of inland carriage from this to Mirzapore, two or three petty Rajahs levy a toll upon the articles on the road, making the cost of sending it down to Calcutta nearly double its original cost at this place. I have petitioned Mr. Bushby to remove the obnoxious duty levied by the native states —but without success, that gentleman declining to interfere in the matter,—although these people have not the least right to do so, no mention being made of hemp as a taxable article in their treaties with the British Government; in fact none was ever exported from here till 1850."

Report on Wool from the District of Jhung in the Punjaub.

By W. HAWORTH, ESQ.

I have carefully examined the sample of sheep's wool, said to have been procured from the Thul or Bar (desert tracts) of the district of Jhung in the Punjaub.

The wool has the appearance of having been taken from the sheep before the staple was fully matured, indeed I am inclined to think not a very long time after the animal had previously been shorn of its covering, in which case the sample under consideration will not by any means represent the true value of the produce of the sheep of that country. I can only report on the sample before me, which is clean, harsh to the feel, fair color, and unmixed with gray or black hairs, short and coarse in staple, and fit only for the manufacture of low goods. I value it to be worth 6*d* to 7*d* per ℔ in the English market, or about Co's. Rs. 10 to 12 per Bazar maund in Calcutta. To judge properly of the value of wool from a new district, a whole and unbroken fleece ought to be sent, and the wool should be full grown.

Similar qualities, but of much longer staple, are now exported from Bombay to some extent.

Result of enquiries in regard to the different kinds of Timber procurable in Bengal, for Railway purposes. Communicated by the GOVERNMENT OF INDIA.

In January, 1852, the Court of Directors forwarded a despatch to the Govt. of Bengal, expressive of their opinion that India possessed ample means for the supply of timber which, when creosoted, would make excellent sleepers for Rail-road; and requesting information on the subject.

Applications were accordingly made by the Board of Revenue, Lower Provinces, to Mr. Stephenson, the Agent for the Railway Company, for a list of the woods considered by their officers to be suitable for sleepers, and a note of the charges at which the sleepers procured for the first section of the line between Howrah and Raneegunge had been delivered in Calcutta; and to Dr. Falconer, Superintendent of the Botanical Gardens.

Mr. Stephenson, in reply, stated "that the opinion of the Chief Engineer of the Railway Company, Mr. Turnbull, was unfavorable to the woods of this country, with the exception of teak and, more recently, of sissoo; but that his own opinion was different, and that he believed that of the 70 or 80 varieties of timber which abound in the forests at the foot of the Himalayas and to the eastward, the principal portion would, if carefully experimented upon, be found suitable for any purposes required. Under existing circumstances, however, Mr. Stephenson added, it had been found that, from the cost of transport in this country, the number of hands the supply has to pass through, and other causes, it was cheaper to purchase creosoted fir sleepers in England than to procure them in this country, and that the last sleepers received from England, when creosoted and delivered in Calcutta, had cost the Railway Company from 4*s* 5½*d* to 4*s* 8*d* or about Rs. 2-4 for each sleeper of 10 feet in length with an angular measurement of 14 inches by 7 inches."

Dr. Falconer is of opinion "that the richest depôt of timber on this side of India is the forests of Assam; that the abundance of water communication renders them and the forests generally on the Eastern Frontier easily accessible; and that he considers the whole of the timbers noted in the margin[*] to be well adapted for Railway purposes and for preparation by the creosote process."

The Board of Revenue next addressed a circular letter on the subject to the Commissioners of Chittagong, Assam, Moorshedabad, Bhaugulpore and Patna. From their replies it would appear "that some of the timbers mentioned by

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[*] *Assam.*

Nahoo or Nagkesur
Sham, Jehaum or Chuplash
Kautal or Kuthal
Sopa, Siba Sopa, Gourea Sopa, Kurreeka Sopa, and Phool Sopa
Chukrasee or Poma
Hindooree or Poma
Seekleea Poma
Hingooree, Joba Hingooree
Gaudh Soroi
Agar or Jarool
Korai and Medula
Sissoo
Heleckha Bor Bola, and Heela Bola
Jamoo or Jamoon
Jutulee
Goomharee
Seriam
Keehur
Huluck
Outenga.

Chittagong.

Chukrassee
Jharool
"Gurjun" Oil tree
Goorgooteah
Battanah
Hurrenah
Artocapus Chaplashe.

Bhaugulpore, Patna and Moorshedabad.

Saul
Sit-Saul
Sissoo
Sanun or Sundun
Toon
Rohuna
Chukrassee
Seriss
Babool
Kair or Khar
Jharool
Asun or Piza Saul
Arjuni
Goombar
Chalta
"Cheer" Pine—"Pinus longifolia."

Dr. Falconer are procurable in the districts of Behar, Chumparun, Tirhoot, Monghyr, Bogra, Rungpore, Chittagong, and Assam. But there is nothing in these returns sufficient to shew in a clear and satisfactory manner, either the quantity of timber that could be supplied, or the cost of the transit of it, so as to permit of any thing approaching to an accurate opinion being formed of the cost at which it could be delivered in Calcutta. or at any given spot in the neighbourhood of the country through which the Railway is to run; nor are the Board inclined to think that any very trustworthy information is likely to be gained on that head until tenders shall be invited for a supply.

"The Collector of Behar estimates the cost of logs of seriss. kulnum, sissoo and assun, of the size mentioned above, at Rs. 2 each upon the ground, with an additional charge for carriage to Shergotty on the Great Trunk Road, of Rs. 3-8, or Rs. 5-8 in all. The Deputy-Collector of Chumparun calculates that saul and sit-saul would cost from Rs. 4 to Rs. 5 a log; sissoo Rs. 6, and toon, seriss, babool, kair, assun, and goombar, something less than saul—besides the additional cost of an average land carriage of 25 miles to the river's brink.

"In Tirhoot, saul alone is said to be procurable and the cost is estimated at Rs. 8 per log delivered in Calcutta; while in Monghyr it is stated that all the woods mentioned in the Board's letter are procurable, with the exception of rohuna, chukrassee, chalta and cheer pine, at an average cost of Rs. 2-8 per log delivered at Monghyr. In Bograh only saul of an inferior quality and seriss of small size is found; but good saul in logs of 10 feet in length, with a diameter of from 1 foot 4 inches to 1 foot 6 inches, are said to be procurable at the large timber mart of Serajgunge, for Rs. 3-8 or 4 each, and they could be delivered in Calcutta at 1 rupee per log more. In Rungpore the wood is reported to be of inferior quality and rarely of the required dimensions. but large timbers of saul, sissoo, toon, goombar and chalta, may, it is said, be had from Bhootan at about Rs. 4 or 5 each. In Chittagong again jharool, gurjun, chuplash and chukrassee are to be had at prices varying from Rs. 1-8 to 4, and a native merchant offers to deliver logs cut to the proper dimensions of 10 feet long by 14 inches square at Rs. 5 each all round. But it is in Assam, as supposed by Dr. Falconer, that the greatest variety of good timber is met with, and the Board have no doubt that that is the quarter to which attention should be turned for the supplies that may be required for Railway purposes. There are, it appears, in those districts no less than 19 different kinds* available, all of which are said to be found in abundance, and any of which a party offers to contract to deliver on the spot in logs of the required dimensions at 2 annas per square foot or about Rs. 1-11† per log.

"The Collector of Durrung particularly recommends to notice the wood called 'Kuheer.' He says that it remains long in the ground without rotting; that it is impervious to the attacks of white ants; and that it appears to have a property of imbibing moisture from the soil and ever remaining fresh, as he has himself seen posts taken up which had been many years in the ground full of moisture in the centre without any signs of decay. If such wood, and many of the other kinds, could be delivered at moderate charges in Calcutta, the Board have little doubt that they would be found to answer every purpose required, and they see reason to expect, if tenders were invited for large supplies, that parties would be induced to come forward to engage at still lower prices than those paid by the Railway Company for the fir sleepers procured from England for the first portion of the line. Each log of the dimensions specified above would cut into 4* sleepers, and 4 sleepers at the rate of those procured from England would cost Rs. 9. But seeing that the logs are procurable for Rs. 1-11, and that the only additional cost of any consequence is that of transit, it seems to the Board that the difference between the cost of the log in Assam in its rough state, and the cost given for the fir sleepers received from England (viz. Rs. 7-5) is so large, as to give ample margin for all expences attendant on putting the wood into a shape fit for use; and that it may reasonably be expected when tenders are invited that contracts will be secured on very favorable terms."

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* 1. Nahur, or Nagkessur,
2. Sham,
3. Kontal,
4. Sopa of three kinds,
5. Saul,
6. Poma of three kinds,
7. Hingoree of two kinds,
8. Gaudsoory,
9. Azor or Jarrool,
10. Koroe,
11. Heeleka,
12. Bhola of two kinds,
13. Jamon,
14. Jutellee,
15. Ooriam,
16. *Koheer*,
17. Haluck,
18. Owteuga,
19. Sonaroo (Mahogany).

† The Collector says 1 rupee 4 annas, but at 2 annas a square foot the log of 10 ft. in length and 14 inches square would be about 1 rupee 11 annas.

Mr. J. N. Martin, Executive Officer, Lower Assam, remarks in a communication to the address of Lieut.-Colonel F. Jenkins, Commissioner of Assam, dated Gowhatti, 21st May, 1852, "that timber of the specified size and description, 14 inches diameter and 10 feet long, could be obtained in Lower Assam, delivered at the great river, for about 3 rupees each, in almost any quantity, up to 8,000 or 10,000 logs.

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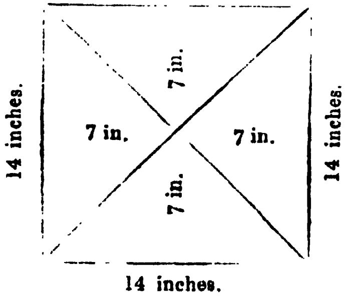
* 14 inches.



The means of transit to Calcutta is very limited, inasmuch as it would have to be laden on boats, as it would be impracticable to take it down in rafts, as there are several large rivers to cross, and in the dry season it would have to pass through the Soonderbuns. the cost of transport would form a very heavy item of expense of which I have no means of estimating.

"The European speculators and traders find it cheaper to send their produce by steamer at 6 annas per maund, than by native boats, at which rate each log would cost about 5 rupees for freight, or say 8 rupees each in Calcutta."

Capt. C. S. Reynolds, Collector of Durrung, in a letter to the address of Col. Jenkins, reports "that nearly all the woods named by the Secretary to the Sudder Board can be obtained in abundance in the South Sager Habee, near this station, in the forests of Chardooar and Nowdooar, and in the low hills in Kalling Doar of this district. Annexed I beg to submit a memorandum of the timber of this district, and places where it is to be found in the greatest abundance.

"The means of transit from the forest to the big river is very easy, as numberless streams intersect these tracts in every direction, and many of them are navigable during the rains, for boats of from 100 to 200 maunds burthen, to the edge of the forest, and even higher.

"The timber should be felled at the fall of the season, and after being cleaned should be dragged by elephants to the banks of the streams, whence canoes can conveniently come in the rains. It may there be constructed into rafts and sent down to depôts on the Burhampooter, where it will have to be made into larger rafts on Bengallee boats and shipped for Calcutta.

"I have no means of giving you correct information as to what would be the probable cost of the logs delivered at Calcutta, but I estimate that it will not be above Rs. 2-8 each log (of the dimensions given). From the little experience I have had in getting saul timbers for my Jail, I believe the cost of felling, cleaning, and transit to the Burhampooter, may be calculated at from R. 1 to R. 1-8 per log. I fancy that it will cost as much more to send it down to Calcutta, as boats must be got up from Serajegunge or Dacca for this purpose, there being none in this province; but the steamers might tow rafts as far as Serajegunge, where boats are always to be procured, and the timbers could be sent thence to the Ganges by the Jenai to wherever it was required. In this way the cost would be something less.

"I would also suggest that elephants, with trucks or very high wheels, such as are used in England in dragging timber from the woods to the drains at the side of the roads to be hoisted on the waggons, should be used, as the cost of each log will be very materially lessened if this plan be adopted.

"I observe a wood called "*Kuheer*" in the list furnished with Mr. Lushington's letter. I fancy this is a mistake, it should be *Kohur*. It is also mis-spelt by Major Hannay in his list of woods of Upper Assam published at page 25, Vol. VI. of the Journal of the Agricultural and Horticultural Society of India. This wood I brought to your notice in a demi-official communication early in 1841 as a valuable wood, and well suited for Railway sleepers, as it may remain a century in the ground without rotting, and is impervious to the attacks of white ants. It appears to have a property of imbibing moisture from the soil and ever remaining fresh, as posts which I have seen taken up and which had been many years in the ground, instead of being dry in the centre were full of moisture. I conceive that this will be found a very valuable wood; and it is satisfactory to know, if it should be required, that it may be obtained in any quantity in this and the Luckimpore district.

"*List of woods available for Railway purposes in the District of Durrung.*

	Wood.	Locality found.	In what quantity obtained.
1	Nahur or Nagkesser,	Chardoar Forest and Nowdoar Forest,	Abundance,
2	Sham, ...	Ditto, Ditto,	Ditto,
3	Kontal, ...	Ditto, Ditto,	Scanty,
4	Sopa of three kinds, ..	Ditto, and South Sager Habee,	Abundance,
5	Saul, ...	Ditto, Ditto,	Ditto,
6	Poma of three kinds,	Ditto, Ditto,	Ditto,
7	Hingoree of two kinds,	Nowdoar and Chardoar Forests,	Ditto,
8	Gaudsorry, ...	Ditto, Ditto	Ditto,
9	Azor or Jarrool, ..	Ditto, and South Sager Habee,	Ditto,
10	Horoe, ...	Ditto, Ditto,	Ditto,
11	Huleeka, ...	Ditto, Ditto,	Ditto,
12	Bhola of two kinds, ..	Nowdoar and Chardoar Forests,	Ditto,
13	Jamon, ...	Ditto, and South Sager Habee,	Ditto,
14	Jutellee, ...	Ditto, Ditto,	Ditto,
15	Joriam, ...	Ditto, Ditto,	Ditto,
16	*Kohur,*	Ditto, Ditto,	Ditto,
17	Haluck, ...	Nowdoar and Chardoar Forests,	Ditto,
18	Outenga, ...	Ditto, Ditto,	Ditto,
19	Sonaroo (Mahogany,)	Ditto, and South Sager Habee,	Ditto,

N. B. The other woods noted in Mr. Lushington's list are not found in this District."

Mr. J. W. Masters, Sub-Assistant Commissioner of Assam, stationed at Golaghaut, reports as follows:—

"Nearly the whole of the timber trees enumerated in the list accompanying letter No. 88, from the Secretary to the Revenue Board, of the 14th May 1852, are procurable in the forests on each side of the Dhunseri and Dyung rivers, between Golaghaut and the Angami and Sutah Naga hills; also near the Mikir and Rougma Naga hills and in the Burra Senaputti Toolarams country between the Huno Janu and the Jumoona at Mohungdyna. Many of the kinds are also procurable on the banks of the Jhanzy, Dikho, Suffry, Derang and Boom Dehing rivers near to the Naga hills, from which they issue along the banks of the Burhampooter above Suddya and in upper parts of the district of Luckimpore.

"The true *sissoo* I have not seen growing wild at any place in Assam except immediately below the Brahmakoond above

Purghat. The Jutuli is not common in this part of the district, but found in Rokan Habbi and most plentiful in Muttuck.

"Of the "*Kuhur*" or "*Kohur*" I have no recollection whatever at present.

"Logs of the prescribed dimension, viz. 10 feet in length and 14 inches in diameter, are generally procurable on the banks of the above-named rivers, but I regret that I cannot hazard an estimate of the probable cost of delivery in Calcutta at present."

Mr. H. Stainforth, Officiating Commissioner 14th Division, in a letter to the Board of Revenue, dated Rajshahee, 16th July, 1852—states that the various sorts of woods referred to by the Board are not to be found, except in very small quantities, in the districts of Pubna, Rajshahee, Moorshedabad and Beerbhoom; and he goes on to observe as follows:—

"*Saul* is found in considerable quantities on the north western part of the district of Bograh, but it is stated to be inferior in quality, and, from the absence of roads and rivers, could not be brought away from the forest without much expense. It is also found in the Raegunge Elaka, but the number of trees is small, and the Zemindars are averse to cutting them.

"*Seris* is found on the western side of the district, but logs of the dimensions required are not procurable.

"The other trees are either not found in the district, or are known under other names.

"The Deputy-Collector states that at the large timber mart, Serajegunge, *Saul* logs measuring 10 feet in length and 1 foot 4 inches to 1 foot 6 inches in diameter, are procurable for from Rs. 3-8 to Rs. 4 each, and that the cost of transport to Calcutta would be about 1 rupee per log. The Deputy-Collector adds that at Jamalpore, Chilmaree, Muddhookhalee and Manickgunge on the Burhampooter, saul timbers are procurable, but that the best place of purchase would be Assam, whence they are brought to the various marts on the river.

"The forest of Pergunnah Bykuntpore in the district of Rungpore and on the Bootan Frontier, produce the 5 kinds of wood named on the margin,* but the Collector's enquiries have led him to believe that the wood is inferior, and not to be had of the dimensions specified in your Board's letter. The Collector also states that large timber of the same sorts of wood is to be had from Bootan, where logs, of the dimensions given by your Board, would probably cost about 4 or 5 rupees each. They could be floated down the Mohanunda, viâ the Pudda, Khurria, or Matabhanga, to the Ganges, but Mr. Trotter has not been able to ascertain the cost of transit as the wood merchants of his district never export wood to Calcutta."

Mr. G. Gough, Commissioner of the Patna Division, gives the following information as the result of his enquiries :—

"Mr. Littledale states that there are no forests in his district (Patna) from which timbers of the kind specified can be supplied.

"Mr. Hodgson states the only timbers obtainable in his district (Behar) are those noted in the margin,† and that such timbers, of the size specified in your Board's letter, can be obtained, on the ground, at Rs. 2 each, but that the expense of carriage to Sherghotty on the Trunk Road, would be Rs. 3-8 for each, making the cost of each timber delivered at Sherghotty, Rs. 5-8.

"Mr. Lautour, of Shahabad, for the purpose of acquiring the necessary information, put himself in communication with Mr. Davies, long a resident at the foot of the hills near Rhotas, and from that gentleman's reply, which I beg to forward herewith, Mr. Lautour sees no prospect whatever of any timber being drawn from the forests in his district.

* Saul, sissoo, toon, goombar, chalta.

† Seris, kurmu, sissoo, assun.

"No timbers of the kind required being procurable in the Sarun Division of his district, Mr. Quintin requested the Deputy-Collector of Champarun to furnish him with the required information.

"In reply, Mr. Glover gives a list of the timbers procurable in the Moteeharry district (and which are specified in the margin)* with their several prices landed at Patna. He describes the average distance from the forest to the ghaut, from whence they would be floated to their destination, as 25 miles, and that land carriage is expensive. The prices mentioned, he adds, are those at which a contract could be entered into, but that were Government officials deputed, the timbers could be landed at Patna 8 annas cheaper.

"From the foregoing reports it would appear that, in this Division, it is only from the forests of Ramnugger, and in the Terrai adjoining Nepal, that timbers suitable for Railway purposes can be obtained. an abundant supply can doubtless be procured from thence, but as I am ignorant of the comparative expence as regards the cost of timber from other quarters, I do not feel myself competent to offer an opinion as to the expediency of resorting to the Terrai Forest.

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* 1. Saul,--This wood is found in abundance; price Rs. 4 to Rs. 6 each.

2. Sit-saul.—Not so plentiful as saul, but can be procured in considerable quantities at the same price.

3. Sissoo,—Plentiful, could be landed at Patna for Rs. 6 each log.

4. Toon, —Do., price rather less than saul.

5. Seris,—Do. do.

6. Babool.—scarce and seldom procurable of the required scantling.

7. Khair.—Can be procured, but not in great abundance, price somewhat less than saul.

8. Assun, .. } Do. do. do.
9. Gumbhar, }
10. Sonum, .. }
11. Rohona, .. }
12. Chuckrasie, } Not procurable in this District.
13. Jharool, .. }
14. Chur Rowe, }

The timbers would be floated down the river Gunduk to Patna, and might in like manner be conveyed down the river Ganges at a very moderate outlay.

Extract of a letter from C. E. Davies, Esq., *dated Rhotasghur,* 12*th June,* 1852, *to* E. Lautour, Esq., C. S., *Collector of Shahabad, Arrah.*

"All the timbers specified in the letter of the Board of Revenue are, with certain exceptions as per margin,* indigenous to this district and a great many other woods adapted for creosote. Saturation might also be added to the list, but it would serve hardly any useful end. All the supplies of wood for the interior of the district of Shahabad and that portion of Behar called Mugeh *des* having, during the lapse of more than a century, been drawn entirely from the forests of the Kymoor in this zillah, our woods exist now merely in name, scattered trees of size are found here and there amid a wilderness of saplings and an undergrowth of large shrubs, so that only a small supply of wood for sleepers could be procured hence; some greatly thinned saul forests on the table lands are partially stocked with timber, but the difficulties of transition thence are great.

"The facilities of conveyance from the Kymoon wilds are at a minimum. The valleys are exceedingly rugged, the mountains excessively steep, and the perpendicular cliffs in all places very high, so that timber is brought to the Soane at great expense. The river itself, likewise, is a great impediment to traffic, as it is irregularly navigable for not more than from three to four months in the year. The cost of inferior timber carried hence would, in consequence of these obstacles, amount to about double that of the superior saul from the forests of Goruckpore and the Terai of Nepal.

"There is a large store of fine timber in a few very inaccessible valleys of the South-western Agency, contiguous to Behar, and the distant forests of the same Division abound with a growth of the most stately *Vatica robusta,* but against all these exists alike that fatal objection, enormous cost of conveyance.

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* Sit-saul or sissoo, toon, chuckras, jharool, uzwon, chalta, cheer.

"In conclusion. permit me to observe, that I regret to say I do not see any chance of the almost exterminated forests of Shahabad being rendered capable of yielding aught in aid of the Railway; nevertheless, I am most willing, and at all times ready, to do whatever lies in my power to further any experiments the Government might be desirous of instituting for ascertaining the wood-yielding capabilities and facilities of transit of this portion of its territories."

Mr. G. F. Brown, Commissioner of Revenue, Bhaugulpore District, gives the following abstract of information obtained from the several Collectors in his Division:—

"*Tirhoot.*—The only timber procurable in this district, of suitable dimensions, and in sufficient quantities for Railway purposes, is saul; and the cost of logs ten feet long, with a diameter of fourteen inches, delivered in Calcutta, would be eight rupees each. The season for felling is from November to the end of February, and previous notice must be given for their provision.

"*Monghyr.*—In this district timbers of all the kinds specified in your letter can be procured, with the exception of rohunn, chuckrasee, chalta, and cheer pine; but whether in large quantities is not stated; the cost at Monghyr would be about Rs. 2-8 each, and the Collector thinks they may be floated down to Calcutta at an additional charge of four annas each log.

"*Bhaugulpore.*—This district is generally very poor in forest trees of large size; and (when procurable) their transportation to the river side is difficult and expensive.

"*Purneah.*—Timbers of the required description are not procurable in any quantity in this district.

"*Dinagepore.*—The only kinds of timber procurable in this district are the saul, sissoo, toon, siris, babool and khair;

but not in any great quantities, or otherwise not of sufficient size for railway sleepers.

"*Maldah.*—The return furnished by the Deputy-Collector of this district is much the same as from Dinagepore.

"As far as I have been able to ascertain, timber of the required *diameter* (viz. 14 inches) is not easily procurable in a part of this Division, though occasionally brought in small quantities from the Morung forests north of the districts of Tirhoot and Purnea. The estimate furnished by the Collector of Tirhoot of the cost of such logs in Calcutta appears to be too high, and that of the Collector of Monghyr too low. A log 20 feet long, with a minimum diameter of 14 inches, would very likely cost Rs. 8, but then this might be cut into two lengths of 10 feet each, and the price of each piece would then be only 4 rupees."

Mr. G. Plowden, Commissioner of Revenue, 16th Division, adds some information on the subject in a letter, dated Chittagong, 11th August, 1852, of which the following is an extract:—

"The following are the woods enumerated in your letter:—

1. Jharool,
2. Gurjun, oil tree,
3. Chaplashi,
4. Chuckrassee,
5. Goorgooteah,
6. Buttanah,
7. Hurrenah.

"Of these, the three first are procurable in abundance of the required dimensions; the fourth, chuckrassee, in a very limited quantity, and the three last cannot, it is supposed, be procured at all of the required dimensions. The Chittagong forests are quite unexplored to any extent in the interior. Judging from their extent, it may be conjectured that the supply of the three first mentioned woods would prove almost inexhaustible.

"There are no means of transit from the forests, except by water conveyance. The trees must therefore be felled on the banks of or very near to some of the numerous streams which approach or empty themselves into the sea, from the river Fenny to the Naaf, which respectively form the Northern and Southern boundaries of this district. The trees are generally felled in the dry season, and left till the rains set in, when they are rafted by lashing large bundles of bamboos to them, by large and small rattans, forming in their turn, articles of merchandize, as soon as disburthened of their timber loads.

"Logs of the required dimensions might be cut and brought to Chittagong at about the following quotations :—

Jharool at Rs. 3-8 to 4 .. each.
Gurjun, at Rs. 1 to 1-8, .. ,,
Chuplashi, at Rs. 1 to 2 .. ,,
Chuckrassee, at Rs. 3 to 3-8 ,,

"These are the probable prices of the timber in its natural state, and exclusive of any profit to a speculator. If cut to 14 inches square, the cost would be about 60 per cent more. A native merchant of this place offers to deliver them here at Rs. 5 each all round, and the present ruling price at the station of a log of dressed red Jarool is about Rs 5-5.

"The further cost of delivering at Calcutta is not so easily estimated. There are three modes of conveyance from hence.

"First.—On native sloops by sea. This could only be done in the N. E. Monsoon, and would be a very expensive method, as the freight would be high, owing to its being the trading season for the sloops, and to the heavy Port charges they would incur. A Chittagong native sloop, of ordinary tonnage, might load about 500 logs.

"Second.—By Balam boats; timber is heavy for these boats. They might be engaged for rupees 50 to Calcutta, to carry 50 logs, which would add a rupee a log, to the quotations already given, for delivering in Calcutta. The cost of carrying toon wood to Calcutta is about 60 rupees per 100; at this rate, the additional cost per log would be from 9 to 10 annas. This mode of conveyance is also available only in the N. E. monsoon.

"Third,—On native sloops to Naraingunge during the S. E. monsoon, to be there stored, and conveyed thence, at pleasure, to any other part of Bengal, in boats or by rafts. This would probably be the cheapest mode of conveyance, and the most convenient arrangement; freight to Naraingunge in the S. E. monsoon would rule light; and river boats, more adopted for the carriage of timber, and for the navigation of the Bengal rivers, than Balam boats, might be procured at Naraingunge in any numbers.

"I should mention that chuckrassee and chuplashi are found to decay soon in moist situations, and the latter, in such situations, in contact with iron, decays very soon round the iron. Gurjun, too, is thought not to be adapted to stand the contact of iron and wet; jharool is thus the only kind of timber that would probably be serviceable. Of this there are two kinds, red and white, the latter kind of a very inferior quality, the former an excellent and very durable wood. At the same time, a very experienced and intelligent gentleman of this place, Mr. Juno Freitas, writes me from Madras, where a letter I had written to him on the subject reached him, that in his opinion, saul timber would answer the required purpose better, and is procurable in Calcutta at a less cost than any suitable wood from hence.

"If, upon the information now furnished, it should be thought advisable to draw on the Chittagong forests for any timbers for Railway purposes, I beg to suggest that the first supplies be obtained through a Government Agent appointed for the purpose, working on account of Government. In this way only, owing to the little that is known on the subject, because of the comparatively limited demand hitherto, can it be properly ascertained in what annual quantities, and at what cost of cutting and transit from the forests to Calcutta, the timber may be procured. These particulars having been fully ascertained, as a check upon contracts, tenders might be invited for future supplies, at first for short periods, to allow competition to establish itself under which the cost would soon be brought down to a minimum.

"In conclusion, I beg to state that the information I desired to collect on the subject was only completely received on the 3rd instant, and that its accuracy may be relied

Further remarks regarding the fibre of the Mŭddār, (Calotropis Hamiltonii,) and on the culture of Cotton, Silk, Tobacco, and other Products in the Punjaub. By CAPTAIN G. E. HOLLINGS.

I have to thank you for a very excellent assortment of flower and vegetable seeds, and to acknowledge the receipt of the specimens of Mŭddar fibre returned in the package with the seeds. I was much pleased to find that the specimens of the fabrics from the Mŭddar, which I forwarded to the Society, had been so favorably reported on by the Flax and Hemp Committee; and I am glad to say that the opinions of the different members who recorded minutes have been fully justified by subsequent experiment. Captain Thompson says "that the plant is better adapted for cloth than cordage; the specimens of fibre sent are cut so short that they cannot be properly dressed and spun into rope yarn, although it appears that, if cautiously removed from the stalks, it might be produced long enough for any purpose."

The specimen of fibre now forwarded (to be sent in the large packet) will, I think, prove that Capt. Thompson's opinion was correct, and the specimen of thread will show from its elasticity and softness that it may amalgamate readily with silk. If a cord of three or four threads of this specimen were made it would, I believe, be found stronger than the twist which sustained 3 cwt. without showing any symptom of distress.

The cleaned and dressed specimen will prove the affinity to silk.

Mr. Joseph Willis, whose known experience and judgment gives a peculiar value to his opinion, says that the fibre possesses very "extraordinary merit and will be very highly valued by the spinners and manufacturers of Great Britain and Ireland for use in all their finer and finest fabrics." He further remarks that "if well prepared it would command a very high price, and if only prepared in a rough and rude manner, that it would sell also to great advantage; the opinion is founded on the presumption that the quantity yielded from a given quantity of land, if in due cultivation, would, on the average, be equivalent to the produce of articles usually cultivated, which could be comparatively estimated."—Mr. Willis then alludes to the raw fibre classed ticket No. 4, which you kindly returned to me as the state of preparation most suited to the English market;—I trust that the specimen that will be now forwarded exhibits the requisites he anticipated, namely, it is that *clean*, FLEXIBLE, *bright* and *lustrous*, with as much length as the natural ramifications of the plants will give. I regret that I cannot add that I have found out any quick and convenient manipulation on the part of the operator, which is so essentially necessary to the full development of the value of the staple, so as to render it completely acceptable to the spinner and the manufacturer. We ought not to be discouraged if we cannot command at once perfect success. When the value of the staple is admitted and public curiosity is excited, apparent difficulties will soon be overcome. We know that even now the plant is naturally abundant, if the product is likely to be useful to trade and it is sought after, improved methods of manipulation and cultivation must follow. Before I conclude this letter, I trust that I shall convince the members of the Society that the Punjaub is not quite so arid, and, as regards commercial purposes, so profitless a country as it has been supposed to be; and although my destiny for the last three years has been accomplished in a country near the ultima Thule of our possessions, I have had many opportunities of proving that an earnest member of the Society, who is determined to be practically useful wherever he goes, may shew that the successful cultivation of the soil depends more on the industry of the people, and the proper application of appropriate knowledge and science, than on the accidents of climate and soil.

To return to the Mŭddār. I would suggest an amendment on Mr. Willis's opinion as to the proper time for applying to Government for support in carrying out experiments regarding the value of the product of the Mŭddār. If we wait until individual enterprise has proved that it can be remuneratively exported, no Government aid will be required to ensure the cultivation of the plant.

Mr. Speede records a favorable opinion as to the strength of the cord made from the fibre, and gives in corroboration of his own the opinion of a nautical friend with reference to the use of specimen No. 9 as a deep sea line, and No. 8 for seizings, both being of great strength.

It appears incumbent on me to give to the Society the result of the experiments and of the knowledge I have gained regarding this particular product since I last wrote. I consider that I have found out that October and November, and April and May, or the periods when the Mŭddār blossoms, and just before it ripens its seed, are the best times to cut the branches for the purpose of extracting the fibre; that it is necessary to let the cut branches dry for at least twenty-four hours before any attempt is made to separate the fibre;—that steeping in water is injurious. The best plan is to select the straightest branches which are always the longest; on the second or third day afterwards the fibre is separated, the sticks are slightly beaten, especially at the joints, which ensures the bark, with the fibre attached, being peeled off without breaking. Now comes *the* difficulty; the workmen bite through the bark about the centre of its length, they then hold the tissue of threads in one hand and separate the bark with the other. I have tried hot and cold water, and all the arrangements known for the separation of hemp, or rather the preparation of sunn, jute, &c., without success; as yet human teeth and nails are the manipulators, but it is not unreasonable to suppose that some chemical process will be discovered by which the bark will readily be separated from the fibre. According to present arrangements, I find that the manufacture of the fibre costs more than £100 a ton, and that of the thread would not cost more than £120 The great expense is in separating the fibre. I have had ample opportunities of knowing that the plant is greatly benefitted by being in the vicinity of cultivation, and therefore have no doubt of its produce being more valuable even if it should only be used as a hedge. I have made arrangements for planting and cultivating a field of Mŭddār, and shall be able to speak positively on the subject next year; in the mean time I trust that the Society will recommend similar experiments to be made in other parts of India. I have observed with considerable interest that attention has been attracted to the Mŭddār as likely to produce a substance like Gutta Percha. I have seen some shrubs in Assam and at Lucknow, from which a substance like India-rubber is produced, and it strikes me that the milk that exudes from those plants is very like the milk of the Mŭddār, and my opinion is strengthened from the fact that all fibres made from the Mŭddār are remarkably elastic. I have offered to give eight annas a seer for as much of the fibre as the people will produce; this price is equal to £56 a ton, which is equivalent to twenty-eight maunds—the money being converted at the rate of two shillings for a Rupee. The women and children of a family could be employed in extracting the fibre, and would soon get into the way of doing it expeditiously. This year, owing to the favorable falls of rain in July and August, the plant has attained an unusual size, and is more abundant than usual; in fact, we may consider that it has been partially cultivated. I am convinced that if a suggestion made by Colonel Tremenhere, of the Engineers, to the effect that the Mŭddar plant should be used as a hedge to protect desert land brought under cultivation from the encroachment of drift sand, is ever carried into effect, it will not only accomplish the object proposed, but it will give a healthful impetus to the cultivation of the plant itself. At present, I think, if the Agri-Horticultural Society would solicit the co-operation of Government to the extent of offering a reward, either in the shape of a pecuniary donation or public acknowledgment to the heads of any village community, in any part of our Indian Possessions, who produced the best specimens as regards both quality and quantity of the fibre of the Mŭddār, with reference to its value as an article of commercial importance, in the year 1854, it would be sufficient to stimulate private enterprise. I have before expressed my opinion that when that is fairly developed there will be no occasion for further assistance.

Having made up my mind to make up for former remissness, I will now take leave of the Mŭddār, and endeavour to give an account of the progress that has been made in the district of Leia in the cultivation of Cotton, which will be more interesting to the Society generally and to the commercial members in particular.

There is not, I believe, one village, in the whole of my district, without some small patches of cotton cultivation; in fact all the clothes of the poorer classes are manufactured at home. Previous to our occupation of the country there was no trade; and even now the export is of little value, and seldom extends beyond the precincts of the district; there are instances of more cotton being produced in a village than is required for the use of the inhabitants, but the surplus is sent to a contiguous one. I have never passed through a village without seeing several cotton walks, in which cloth of the coarsest kind was being made, and at every cottage or well the cotton-wheel for making thread is busily turned. The indigenous cotton, as you will see from the specimens I intend sending to you, is of very short staple, but snowy-white and of apparently good texture. It would not, I imagine, be of much value as an article of export trade, that is for the English market, especially as it cannot be produced for less than four pence a pound. Mr. Edgeworth, the Commissioner at Mooltan, was, I believe, the first person who considered that the climate and soil in this part of India were favorable to the cultivation of Mexican cotton. He gave some seed to Capt. Farrington, the Deputy-Commissioner at Khanghur, in April or May, 1851, who kindly sent some to me for experiment. Although the season for planting was past, I determined to try what could be done. I gave some seed to the Sub-Assistant Surgeon, Ramsoondhur Ghose, who took great care of them, and incurred some expense in carrying on the experiment. I sowed the seeds according to the instructions I received, namely, four seeds at intervals of four feet. The great rise of water in the inundation of July and August, 1851, totally destroyed all the plants from the seed I had sown. The Sub-Assistant Surgeon was more fortunate, and the plants from the seeds given to him yielded a fair return, and a supply of seeds for the second year's planting, which he made over to me; his plants were allowed to remain in the ground, and although they were much neglected by the Zemindar, who ought to have looked after them, has yielded some good and full pods this year.

Capt. Farrington sent some cotton seeds to Capt. Voyle early this year; they were planted at the proper season: also the seeds I obtained from the Sub-Assistant Surgeon: and lastly, Mr. Edgeworth sent a supply to Major Ross, the Commissioner of the Leia Division, who gave a large portion to me.

I took a great interest in the cultivation of cotton, and always referred to Dr. Wight's papers on the subject. I found that the practice in this part of India was very similar to that followed in America, and that the seasons for planting and gathering in the harvest were the same.

The seed was sown as in the previous year, that is four seeds in each drill, and the drills were four feet from each other; the ground had been well prepared and manured previous to sowing, and afterwards was ploughed over three or four times. The shrubs attained a great size, the stems and leaves bore evidence of a very luxuriant growth. In September the leading shoots were stopped, which is a practice adopted throughout the district. There was an ample supply of water; the plants in my own garden were watered from a water-wheel erected on the bank of the nullah, as well as from the garden well; but I have no reason to suppose that the produce is greater than in the other fields, nor can I perceive any great difference between the produce of the seeds received this year, and that which may be considered acclimated, as having been saved from last year's produce by the Sub-Assistant Surgeon; moreover, I am convinced that if the plants that have been two years in the ground, had been properly taken care of, they would have produced the best cotton of all.

Amongst the plants in my own and the public garden, there were some of the indigenous cotton that experienced the same treatment as the Mexican plants, but have not proved more productive than the plants cultivated by the ryots in the sandy soil on what was formerly the high bank of the Indus, which would seem to prove that the difference of the product of the foreign and indigenous plant depends entirely on the seed.

The following is the result of actual weighments:—

One pod of the produce of the Mexican cotton weighs more than four pods of the indigenous cotton.

In the country cotton the seed is equal to three-fourths, the cotton to one-fourth.

In the Mexican cotton the seed is equal to less than two-thirds.

One pod of Mexican cotton weighs, on an average, one dram and a half. The cotton when separated weighs from 38 to 40 grains.

The crop is not yet gathered in, and, therefore, I cannot say what proportion the produce of a beegah of cotton from Mexican seed bears to that of a beegah from indigenous seed.

The Society will be able to judge, from the specimens that I purpose forwarding, if the climate and soil of this part of the Punjaub are suited to the cultivation of the great staple, cotton. I sent small packets of seeds to be planted in different parts of the district, and have not yet received any information as to the outturn, but hope to do so soon. It will be satisfactory to the Society to know that the Zemindars are convinced that the foreign seed is better than any other they can obtain; they are *anxious* to get it, which is the best guarantee for its continued cultivation.

The enclosed meteorological register, for which I am indebted to the Sub-Assistant Surgeon, will prove that Dr. Wight was quite correct in thinking that excessive heat would not interfere with the successful cultivation of cotton. The soil on which indigenous cotton flourishes best is apparently pure sand, but there is throughout the district much salt on the surface of the ground, and the water is frequently impregnated with salt. We are, I think, indebted to the clear sky and dry weather that obtains from the middle of September to the middle of November, for the clear, pure, brilliant white of even the indigenous cotton. The supply of water is unlimited.

I send you specimens of cotton from Mexican seed in pod from different fields at Leia, of cleaned cotton from ditto, and of thread; and I also forward specimens of indigenous cotton, the best I could procure, in order that every information may be afforded to those interested in the cultivation of, or trade in, cotton. I confidently expect that in a very few years large exports will be made from this district. Before finishing this letter I thought it right to examine the produce of indigenous cotton in all the fields, and was much pleased to find that there was good cause to modify the opinion that the difference in the outturn was solely to be attributed to the seed. I find that the plants of indigenous cotton, that were allowed to grow in the public garden amongst the Mexican cotton, are very far superior to those grown near the town, and the produce much greater. Considering the matter of great importance, I have resolved to send you the specimens of the different kinds of cotton by dawk banghy. The quantity of each is necessarily small, but I hope it will be sufficient to enable the examiners to form correct opinions. I will send larger quantities with the other specimens of agricultural produce, which shall be forwarded by waggon train from Lahore.* Although my observations and experiments are limited to the district of Leia, I sincerely trust that you will receive equally favorable accounts of the cultivation of the cotton from Mexican seed from Mooltan, Kanghur, and the Derajat.

In 1851, I attempted to make some Silk. Through the knowledge of a native friend I obtained some silkworms' eggs from Cashmere. The mulberry thrives very well in this neighbourhood; I found that the leaf-buds did not open till late in the season, and when from the natural heat of the climate the eggs were hatched, there were no mulberry leaves on which to feed the young worms; fortunately I had a large supply of lettuce plant in my garden, which made an excellent substitute. The eggs were sent from Cashmere in a lotah, without any paper or cloth, and there was some difficulty in finding out how they were to be successfully hatched; and I was absent at the time when the worms first made their appearance. A native friend suggested that the lettuce leaves should be dropped into the lotah, and after they had been there a short time they were taken out, and it was found that the young worms had attached themselves to them; a fresh supply of leaves were put into the lotah with the same result, and so on, until all the worms had been extricated and placed in trays. By the time the worms had arrived at the second change, there was an ample supply of young mulberry leaves: the progress of the worms was very satisfactory up to the last change of the skin, from which time the heat of the weather, which was steadily increasing, appeared to have considerable effect on them; very many sickened, turned yellow, and died, some made tolerably good cocoons, but I had to teach the carpenters to make the reels;—unluckily I had brought no model from Lucknow, and thus they were very imperfect; then I had to teach some persons how to reel off the silk, and many cocoons were expended whilst they were learning. It will not be considered surprising that the silk was eventually very inferior; there was nothing however to prevent a repetition of the experiment, and I procured a good quantity of eggs; unfortunately, when the great inundation occurred in July and August, I was obliged to abandon my house, and the lotah containing the eggs was exposed to the heat, which at the time was intense, and must have destroyed the eggs, for no worms were forthcoming the next season. I have not repeated the experiment, but I purpose doing so if I can get some eggs from Cashmere, although I am not sanguine of success, as in this climate there is not sufficient time for the development of the worm between the period when young mulberry leaves cannot be obtained and the commencement

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* None of these specimens have yet reached the Society.—Eds.

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* None of these specimens have yet reached the Society.—Eds.

There has been a great demand for Wool for the Bombay market this year, which has caused a great increase in price. Hitherto it has been considered of so little importance that it was given to servants as a portion of their pay, but this year it is selling for 10 or 11 rupees a maund. The agent of a Bombay merchant passed through Leia a few days ago, who was anxious to buy any quantity of wool, but he found that the supply had been exhausted; he said that once before he came to this part of the country and purchased a large quantity of wool at four rupees a maund. Then no one seemed to consider it of any value; now he would be glad to give the price mentioned above. I will include some specimens of wool in the large parcel.

The cultivation of Sugar is increasing, but as yet very little is exported, except to Mooltan from the southern part of the district.

Indigo has always been cultivated to a small extent, as it is purchased by the Affghan merchants on their return from Hindoostan. The high beegah-rate levied by former rulers and other taxes limited the cultivation, but for the last four years the produce has been sensibly increased; but sufficient is not produced to keep down the price which is steadily increasing. In 1849 it sold from 30 to 35 rupees a maund, this year it has fetched as high as 52 rupees a maund.

The Poppy is not extensively cultivated, because there is no market; but I have been informed by competent authority that it could be produced to any extent and, with improved manipulation, would be of as good quality as any grown in India.

The Tobacco is very coarse, but as it grows luxuriantly I presume that under proper cultivation it might prove a valuable product.

The plant from which soda is produced, (I have had some prepared, which is of a snow-white color and beautifully and perfectly chrystallised) might be cultivated to any extent, if the tracts on which it grows naturally were enclosed. At present, the camels when grazing eat the greater portion of the crop. Prepared in the shape of soojee it is used in the preparation of soap and for bleaching purposes.

The Hemp and Castor-Oil plants are little cultivated, but they thrive wonderfully and might be cultivated as hedges. There are some excellent specimens at Leia and in different parts of the district.

In every part of the district in the low lands, near the Indus, there are extensive patches of land on which the Khānā grass grows wild and attains a great height; the lower portion, that is from six to eight feet, is used for thatching huts, the upper portion is converted into moonj rope, of which immense quantities are exported, principally to Lahore and other large towns; and the finest parts, near the long silky flower, are manufactured into sirkee.

The Date trees afford materials for mats, very neat and strong baskets, &c., &c.

In this letter I have confined my remarks to articles of commercial importance; in future ones I will give an account of our forest and forest-trees, of the result of our cultivation of vegetables, and lastly, of the flower gardens,—as leisure and opportunity serve.

Before concluding, I must assure you that I will take every care of any seeds or cuttings which the Society may wish to be introduced into this part of the country, and that I shall be happy to send in return any specimens of the products of this part of the Punjab.

There is a circumstance regarding the soil and the effect of climate which appears to me worthy of notice, which is that the vitality of seeds or bulbs is not destroyed either by the extreme heat or by the liberal use of water. When the proper season returns, self-sown seeds germinate, and the produce is generally equal, not infrequently superior, to that from the original seeds; many of delicate flowers—such as the *Portulaca*, *Petunia* and *Salvia*—were not destroyed by being under water during the great inundation in 1851, whilst sweet peas, wall-flowers, stocks, Clarkias, varieties of pinks, coreopsis, Flos Adonis, mignonette &c., &c. with all the convolvulus tribe and ipomeas—came up in the greatest abundance. The great size that shrubs, vegetables, and flowers attain is very remarkable; we have had artichokes that were six inches in diameter, two of which weighed more than a seer, and of excellent flavor, and I have at present several plants of the *Ipomœa rubro cærulea* covered with the richest blossom, each flower of which is four and a half inches in diameter.

I really must finish this letter, with the expression of a hope that other members of the Society may be induced to make known the result of their observation and experience.

Return of the average height of the Thermometer in the shade at Leia in the Punjab, from January to October 1852, with the highest and lowest temperature in each month in the shade and the sun's rays. Observations taken by Sub-Assistant Surgeon Ramsoondhur Ghose.

LATITUDE 30°-58° NORTH.	LONGITUDE 70°-30.° EAST.							
Months.	At Sun rise.	At apparent Noon.	At 4 P. M.	Maximum in shade.	Minimum in shade.	Maximum in Sun's rays.	Rain. In.	Remarks.
	°	°	°	°	°	°		
January, ..	53.40	56.30	58.85	64	46	112	$0.\frac{1}{10}$	
February, ..	59.82	65.03	66.65	70½	50	119½	$0.\frac{2}{10}$	
March, ...	66.	69.70	70.72	80	59	124½	$2.\frac{1}{10}$	
April, ...	74.15	78.11	80 25	89½	64	150	1.	
May, ...	81.75	85.53	87.72	95	72½	159	0.½	
June, ...	90.18	94.20	96.76	104	80	168	$0.\frac{9}{10}$	
July, ...	88.19	92.	93.22	99½	76	155½	$8.\frac{2}{10}$	
August, ...	81.11	84.40	86.43	95	76	138	$7.\frac{7}{10}$	
September, ..	79.46	84.9	88.93	93	72½	127½	None.	
October, ...	61.58	69.16	77.3	83	52	130	None.	
Total, ..	735.64	778.52	827.56	873½	64.8	138.4	$20.\frac{7}{10}$	
Averages, ..	73.46	77.71	82.15	87.35	64.80	138.40	2.10	

P.S.—I have sent you by dawk banghy to Lahore, and from thence by waggon train, the specimens mentioned in the accompanying list, which will I trust reach you in safety and prove acceptable to the Society.

SPECIMENS OF COTTON, &c.

BOX NO. 1.

No. 1 Mexican cotton grown in Capt. Hollings's garden, this years' seed from Mr. Edgeworth.

No. 2 *(Upper Row)* Mexican cotton from Kucherree field, this years' seed.

No. 3 Mexican cotton from Public Garden.

BOX NO. 2.

No. 4 *(Lower Row)* Indigenous cotton grown near the town of Leia.

No. 5 Indigenous cotton from Public Garden.

No. 6 *(Upper Row)* Do. do. from Capt. Hollings's garden.

No. 7 Thread from Mexican cotton from Public Garden.

No. 9 Do. Indigenous do. grown near the town.

G. E. H.

Notice regarding certain descriptions of Rattans and fibrous yielding plants from Arracan. By CAPT. F. W. RIPLEY, *Junior Assistant Commissioner of Arracan.*

MY DEAR SIR,—I have, by favor of Mr. A. T. T. Peterson, sent you for the Society a box containing five kinds of Rattan and three young trees, from the bark of which the Mhugs manufacture a good strong rope. Enclosed is a memorandum shewing the rates they are sold in the Akyab Bazar, and the length they grow to, and for what purpose they are generally used. I was in hopes of sending you some of the raw fibre, and some small pieces of the rope manufactured from the same, also specimens of the canes, but they have not yet been brought in; I will however send them by the next opportunity.

AKYAB, ARRACAN: *2nd Nov.*, 1852.

P.S.—Since writing the above, I find cane No. 3 on the list is looking so sickly that I am afraid it will not reach alive.

I have therefore taken it out of the box, and will send some plants of it next month.

Memorandum of Rattans.

No. 1. Khayan Rattan.—Very common on the banks of the several creeks in Arracan, procurable in lengths of 12 feet. 200 whole canes for the rupee—used in house building, and for weaving baskets, &c. Seldom exceeds 30 feet in length.

No. 2. Red rattan,—not so useful as No. 1, not being so durable.—used in the same way, procurable in lengths of 10 to 11 feet, average price 400 whole canes for the rupee. This seldom exceeds 30 feet in length.

No. 3. Napat rattan. This is a very durable cane, and much used in the sewing of the native boats,—it is dear, not more than 50 canes of 12 feet being generally procurable for a rupee. It grows however to a great length, and is often to be procured 150 feet long.

No. 4. Krat rattan.—This is the most durable of the four and is used in various ways, particularly as fastening for the bamboo fishing nets used by the Mhugs. This is generally sold in lengths of 70 to 80 feet, only 4 or 5 being procurable for the rupee. It is often found as long as 130 to 150 feet.

No. 5. Thoing rattan.—This is also very durable, and used in various ways, procurable in lengths of 40 to 50 feet, but generally sold in lengths of 10 feet, at the rate of 100 per rupee.

The fibrous bark Plants or Trees.

No. 1. Called Shan ne.—This is a large tree, which grows in all the jungles of Arracan, to the height of 30 feet or so, in girt about 24 or 27 inches, the bark is stript off, soaked in water, and treated the same as Jute. From the fibrous material a stronge rope is made by the Mhugs. The raw material is procurable in the Akyab bazar for about 2 rupees the maund.

No. 2. Called Shan phrus.—The same as the above.

No. 3. Batharan Shan.—The same as the other two but *is scarce, and not procurable in any quantity. I have never* seen this for sale in the bazar.

I have sent you by this steamer two boxes containing specimens, as per margin, of the Rattan Plants, and hope they will reach safely, and also a box with some of the raw and manufactured material of each of the Shan plants, and one each of the rattans. They are numbered so that you will be able to recognize them.

No. 1. Khayan,
,, 2. Red Rattan,
,, 3. Napat,
,, 4. Krat,
,, 5. Thoing,
,, 6. Labau,
,, 7. Pokoung,

In addition to the 5 canes I gave you in my memorandum, there are now included—

No. 6. Labau.—The same description of rattan as No. 1.

No. 7. Pokoung.—This is a very useful and durable cane; it is used in basket-making, &c., it varies in length from 100 to 150 feet,—and is procurable in any quantity, price in proportion to length, from 1 to 2 annas a cane.

I hope these will reach in better order than those sent last month.

I remain, &c.,
F. W. Ripley.

Akyab: 12*th Dec.*, 1852.

Report on specimens of the fibre of Agave Cantula from Indore. Communicated by R. N. C. Hamilton, Esq., *Resident at Indore.*

To the Secretary to the Agricultural Society, Calcutta.

Sir,—I have the honour to forward copy of a letter from Dr. G. Tranter, Surgeon in charge of the United Malwa Contingent, together with some specimens of the fibre of the Aloe,* and shall be glad if they prove acceptable.

* Dr. Tranter has furnished specimens of the plant, which Dr. Falconer recognizes as belonging to *Agave Cantula.*—Eds.

2. I may mention that I have heard that formerly the heel ropes used by the Pindarees, were made of this fibre, but that it does not at present appear to be applied to any purpose.

I have &c.,

INDORE RESIDENCY:
27th April, 1852.

R. N. C. HAMILTON.
Resident.

TO ROBERT NORTH COLLIE HAMILTON, ESQ.,
Resident at Indore.

SIR,—A few days ago whilst superintending some public buildings in course of erection at this place, my work was brought to a stand still for want of "Bukkul," the fibrous bark of the roots of certain trees which is used in this part of India as a cheap substitute for string and cord. None of this material was obtainable at the time in the Bazar, and on my asking whether any thing else could be used in its stead, one of my men brought to me some of the large fleshy leaves of the Aloe, and tore them into strips of about half an inch broad, saying, they were strong, and would answer every purpose.

On looking at these strips attentively I found that I could pull out single fibres (with a little care) measuring from twenty to thirty inches in length, and they appeared so strong that I was at once led to try and separate a quantity of them for further examination, and I succeeded.

I soaked a number of the fresh leaves for a week in a tub of water; then had them taken out and well beaten with a stick; the outer skin of the leaves was in this way detached, and I found the rest to consist altogether of beautiful fibres merely bound together by gelatinous cellular tissue.

I then put them into fresh water, and after two or three days, had them beaten a second time, and well washed in several different waters.

The result has pleased me so much that I make no apology for bringing it at once officially to your notice, and with this letter I forward three specimens of the material in three stages of preparation. Number 1 shews the fibres in bands of about half an inch in breadth, in the precise state in which they exist in the leaf, some of the coarse cellular tissue still holding them together.

Number 2,—is a similar specimen but has been more carefully washed and cleaned. The bundles of fibres are however still to be seen as in Number 1.

Number 3,—shews the material in a more advanced state; the separate bundles of fibres have been carefully washed and rinsed, and then the fibres separated by hand from the impurities observable in Number 1 and 2.

As I am altogether ignorant of the mechanical processes by which Jute, Hemp, Sunn, and such like materials are prepared for the market, you must not look upon these as fair examples of what this article is capable of; but I desire chiefly to solicit your attention to three points, viz:

1st. To the length of the fibres, and to the strength and beauty of the raw material;

2ndly. To the fact that the plant producing it grows freely in Malwa, and requires little or no cultivation.

3rdly. To the very simple process above detailed for separating the fibre from the other parts of the plant.

I have, &c.,

(Sd.) George Tranter.

Surgeon United Malwa Contingent.

Minute by Capt. A. Thompson.—I have tested the Aloe fibres from Indore, and find the strength quite equal to the best Russian hemp. It would answer very well for the running-rigging of ships. The staple is much shorter than that of hemp, which is somewhat against its being favorably looked upon by Ship Captains.

A considerable quantity of fibre exactly similar has lately been imported from the Malabar coast, and I have made some into rope, which very much resembles Manilla rope, but time is required to test its durability. The value here at present is about five Rupees per bazar maund, but were it once brought into general use, it would no doubt command a higher price.

A. THOMPSON.

Minute by Mr. Joseph Willis—I believe that this description of fibre is not new to the Society. I think that I have seen better prepared specimens than these of Dr. George Tranter.

These show, from some cause which I am not able to explain, a degree of tenderness which ought not to belong to them.

Whatever merit the Aloe fibre may possess,—and I am not about to underrate it,—it has, I think, to meet with the competition of so many others of superior and well-known value in the great marts of the world, that its value is probably to be best found in its own localities of growth for local uses. But the question still remains as to the possibility of producing and exporting it to other markets, proximate or distant, from those of its own locality, so as to afford remuneration.

JOSEPH WILLIS.

CALCUTTA: *June 8th*, 1852.

Results of the trial at the Hill Station of Mussooree of the North American Fruit Trees imported in Ice per "EPAMINONDAS" *in the early part of* 1850.

To the Secy. to the Agri-Horticultural Society of India.

SIR,—By desire of the Hon'ble the Lieutenant-Governor of Agra, I have the honor to forward copy of a letter to my address from the Secretary to the Government, N. W. P., No. 464, dated the 15th ultimo, with its enclosures, communicating the results of the trial of the North American fruit trees imported by Mr. Ladd, on board the *Epaminondas* early in 1850, at the Hill Station of Mussooree.

2. Detailed particulars regarding the manner in which the plants were packed when put on board the ship, are contained in the correspondence printed in Part 2, of Vol. VII. of the Society's Journal (p. 172). The plants were not put up in Ward's (glazed) cases, but simply in closed deal boxes, stowed among the ice blocks in the hold.

3. The results upon the whole are satisfactory. Dr. Jameson's letter enumerates 20 varieties of fruit trees imported by the *Epaminondas*, which appear to have been fully established at Mussooree.

4. With reference to the concluding part of Mr. Muir's letter, it is to be regretted Mr. Ladd had not repeated the spirited and interesting venture, which succeeded so well in the case of the *Epaminondas*.

H. C. BOT. GARDEN: H. FALCONER, M. D.,
7th April, 1853. *Superintendent.*

TO H. FALCONER, ESQ., M. D.,
Superintendent H. C. B. Garden, Calcutta.

Genl. Dept. N. W. P. } SIR,—With reference to the correspondence noted in the margin, I am directed to transmit to you the accom-

From Supt. Botl. Gardens, Calcutta, dated the 20th March, 1850.
To Do. Do., dated the 4th of April, 1850.

panying copy of a letter from the Superintendent of the Botanical Gardens, N. W. Provinces, dated the 5th instant, No. 150, respecting the American fruit trees made over to his care.

2nd. His Honor recommends that the results now reported, be communicated by you to the Agricultural and Horticultural Society, with any further observations which your experience and knowledge of the subject may suggest. It seems to the Lieut.-Governor most desirable that the experiment once thus far successful, should be, if possible, repeated, with such additional precautions, as past experience may suggest. The Lieut.-Governor will gladly sanction any moderate expense that may be necessary for the attainment of the object.

I have, &c.

AGRA : (Sd.) W. MUIR,
15th March, 1853. *Secy. Govt. N. W. P.*

To W. MUIR, ESQ.,
Secretary to the Government N. W. P., Agra.

Genl. Dept. SIR,—I have the honor to acknowledge the receipt of your letter No. 2230, dated the 16th of November last, with enclosure, and in reply to state, that the American fruit trees therein alluded to, were forwarded to Allahabad by a Government steamer on the 30th April, 1850, and from thence by bullock train to Saharunpoor, and no means were, nor could be, taken to secure for them a winter climate after leaving Calcutta. In America the plants were removed from the ground at the beginning of winter, or when they were leafless, and in a torpid state, and were kept in this condition, until their arrival in this country, by being packed in Ward's cases, which were buried in ice in the hold of the American Vessel *Epaminondas*. By this treatment they were prevented from budding during the voyage. On being removed from their ice-bed, the buds immediately commenced to swell, and before they reached Saharunpoor many of the plants had formed shoots several inches in length. In my letter, No. 192, dated 24th May, 1850, to the address of Mr. Secretary Thornton, I gave a detailed statement regarding their condition on their arrival at Saharunpoor. As soon as arrangements could be made they were all sent to Mussooree, where most of them did well until the setting in of the rains, when many, owing to the superabundant moisture, were destroyed. The fall of rain during the season of 1851-52 was comparatively very great, amounting to about 85 inches. The winter, too, was exceedingly severe, snow having fallen to a depth of several feet, and although all the plants were well manured, and carefully protected with grass, several perished.

The following is a list of the American plants now planted out and in good order in the Mussooree Garden :—

1.	Flemish Beauty Pear,		1	plant.
2.	Hull	do. do.	2	,,
3.	Pusse Colmar,	do.	1	,,
4.	Glout Mooreean,	do.	2	,,
5.	Red Astrachan Apple,		1	,,
6.	Early Bough,	do.	2	,,
7.	Peach,	do.	1	,,
8.	Kerry Pippin,	do.	1	,,
9.	Greengage Plum,		2	,,
10.	Jefferson's	do.	1	,,
11.	Greengage	do.	1	,,
12.	Imperatrice Plum,		1	,,
13.	Bleckes yellow gage Plum,		1	,,
14.	Honeysuld Cherry,		1	,,
15.	Florence,	do.	1	,,
16.	Large long Bavarian Cherry,		1	,,
17.	Black Tartarian	do.	1	,,
18.	Lady Sweet Apple,		1	,,

19.	White Currant,	1	plant.
20.	Red do.	1	,,
	Total,	24	Plants.

I have &c.

SAHARUNPOOR : (Sd.) W. JAMESON,
March 5, 1853. *Supt. Bot. Gar. N. W. P.*

Correspondence regarding the Rheea fibre of Assam (Urtica tenacissima, Roxb.) and its value in the English market.

[Communicated by the Board of Revenue, Lower Provinces.]

TO COLONEL F. JENKINS,
Commissioner of Revenue, Assam.

SIR,—I have the honor to advise you of the despatch, by a magazine store-boat in charge of Sub-Conductor Courtney, of 15 bales of Rheea and *Bœhmeria* fibre prepared by Major S. F. Hannay in the manner which he has found to be best adapted for the Home market.

2nd. Major Hannay's praiseworthy exertions to bring these valuable grasses into the notice they merit are well known to you and, I believe, to the Board of Revenue. Having put himself into communication with Mr. William Sangster of London, he was solicited by that gentleman to prepare and send home half a ton of the grass cleaned and packed like one of the samples previously sent. By great perseverance, and at some expense, Major Hannay has collected and prepared this quantity, but considers it best to place it at the disposal of the Board of Revenue and Government, for which purpose he has made it over to me, with the correspondence on the subject that took place between Mr. Sangster and himself.

3rd. I beg to annex herewith copy of Major Hannay's letter to my address, and extracts from the communications of Mr. Sangster referred to therein.

4th. A portion of the contents of the bales was raised in a spot of ground near the Jail, enclosed by my predecessor and retained by me for experimental cultivation of this description.

5th. Rather more than three bighas or just about an acre of this plot is planted with Rheea, which last season gave seven Indian muns of fibre, the whole of which I made over to Major Hannay in aid of the experiment, and it is now included in the bales sent down.

6th. It is not necessary for me to enter into any disquisition in regard to the nature of these fibres which have been reported on and noticed by scientific gentlemen and learned Societies. There can be no question, either, as to their value when properly prepared; but in regard to the extension of cultivation of the Rheea to meet the probable demands of the Home market I would venture to suggest the expediency of some assistance being given on the part of the Government.

7th. I believe the best method would be for Government to offer a premium of so much a ton on all that is produced for three or four years. At present the cultivation is restricted to a particular class, the Dooms or fishermen, and the only use made of the fibre is in the manufacture by them of nets. For this purpose the fibre sells in the bazar at as much as 8 annas the seer. The price is high only because the quantity raised and required has hitherto been so small, but to introduce its more general cultivation it would, I think, be necessary to hold out at first a greater inducement than the price offered by Mr. Sangster. To offer a premium would be better than to have an experimental Government farm, for there is no mystery in the process of rearing the plant, and the premium would stimulate the ryotts equally with the speculator.

I have &c.

DIBROGHUR : (Sd.) E. T. DALTON,
1st March, 1853. *Collector.*

To Captain E. T. Dalton,
Collector of Luckimpore, Dibrooghur.

Sir,—I beg leave to acquaint you that from the produce of the Jail and my own garden, together with what I have procured from the Meerees near Dibrooghur, I have now by me about half a ton weight of the Rheea (China) and *Bœhmeria* grass, which, with a view to its being brought forward as an article of value in the English Market, I am anxious to dispose of in the manner most likely to answer this object; and as I have already brought to the notice of Government, through the Board of Revenue, the method of cultivating and preparing these fibres, and my wish to do all in my power to introduce their flax or hemp to the notice of manufacturers in England, I think I can do nothing better than to enclose you two letters I have lately received from Mr. Wm. Sangster of London, to whom I sent last year a small quantity of Rheea and *Bœhmeria* grass, and to propose that the present crop should be sent either to that gentleman, or direct to any East India Broker in London, who would test the real value of these fibres in the market.

2nd. You will observe that Mr. Sangster offers to pay £20 per ton for any quantity in Calcutta. This, however, for an article which approaches so nearly in quality to the best flax, is a low price; and when I assure you that under the method of preparation adopted by the Chinese and myself it costs at least 5 Rupees per maund, you will see that it can scarce be sent to Calcutta at the price offered; however, it is to be hoped that some cheaper method of preparation from the stalk may yet be adopted, in which case, considering the advantages of such quantities of available land in Upper Assam, I venture to say the Rheea would under-sell all other flax in the Home market.

I beg to add that there are 15 Bales made up as Mr. Sangster suggests; 10 of these are Rheea (Chinese) grass and 5 of the *Bœhmeria* grass or hemp. With regard to Mr.

Sangster's letters, which are enclosed in original, you are at liberty to send them as they are, or to make such extracts as you may think proper from them.

I have, &c.,

DIBROOGHUR : (Sd.) S. F. HANNAY.
24th February, 1853. *Comdg. at Dibrooghur.*

To MAJOR HANNAY,

DEAR SIR,—I have to return you many thanks for the handsome present you have made me of 5 bales of Rheea, the first that have ever been imported into the country, (through the letter from Colonel Jenkins addressed to Messrs. Cantor and Co.)

I cannot by this mail send you all the information I could wish, having received the bales only a few days since, and have only been enabled to get a small quantity hackled, but according to the opinion of my broker there will be a very extensive market for this article which, no doubt, will soon become one of great importance to India.

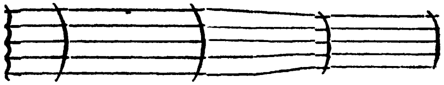
Dr. Wallich has seen it and is much pleased, and I have just received a note from him dated August 5th, in which he says—"The Rheea fibre you showed me is indeed a vast achievement. I am entitled to speak decisively in this matter because I utterly failed in producing the article as did one far greater than me, namely, the celebrated Dr. Roxburgh ; so much more credit is due to Col. Jenkins and to Major Hannay for their complete success."

The samples that I received in 1850, from Messrs. Cantor and Co., and which I understood were forwarded by you, were unfortunately destroyed by being saturated with bilge water rendering them rotten, otherwise we should have made some experiments with them.

Having determined to abandon the original idea of making a very beautiful article to compete with silk, after three years of trouble and expense, I have fallen back upon flax and hemp, where the market is much larger, and I can sell as much as you please to grow; but the price would not be quite so high, and if I pay freight, insurance and all charges, I could give you £20 per ton delivered in Calcutta, and which price with all expenses would not leave me much margin.

The best of the kinds in the 4 bales is the enclosed sample; the stinging nettle would not fetch a remunerating price and the kind that has been wetted had better be left in its original state like enclosed sample.

I should be glad if you could forward me 10 tons as soon as possible, and if you will have the kindness to inform me by next mail, if possible, how the cultivation is to be managed, as I see by the letter from Col. Jenkins to Messrs. Cantor and Co. that you do not intend dealing in the article yourself, and I presume the natives would cultivate on their own account. But I write to Messrs. Cantor and Co. by this mail more fully on this subject;—at all events I hope and trust no time will be lost.

In the 5 Packages, one was packed the full length, thus ; this is the preferable way. I need scarcely say that every thing depends upon the quality of the Rheea and the cleanly way in which it is got up; the bale packed full-length, in my opinion, was every thing to be desired.

Awaiting your's, &c.
(Sd.) WILLIAM SANGSTER.

LONDON: *August*, 1852.

Extract of a Letter from MR. WILLIAM SANGSTER, *of London, dated 24th December*, 1852.

"I have just received your letter of the 5th October, and although you say you cannot enter into the speculation of cultivation of the Rheea in a commercial manner, I am much gratified to find you will still continue to rear it, and that you will shortly be able to ship me another half ton, and I trust that the expense that it costs to cultivate and prepare similar to the 5 bales would be much lessened by its being carried on, on a large scale. Depend upon it, its only a question of time, it must come into the market. I have shown it to several of our flax spinners, and they one and all admire it very much, and are only waiting to receive a quantity to begin upon. I must tell you that one flax merchant in London wants me to take his contract for one hundred tons, but acting under the advice of our E. I. Broker, who says it is of no use taking contracts, as he will take upon himself to say he will sell any quantity, however large, at public sale.

"I have consulted with our Engineer who prepared all our China grass so beautifully, and he says your samples are equal to the best sorts from China; and, by the bye, I have several bales of that article coming direct from Shanghai, which I am told is the cheapest market, being determined to get all the information possible relative to Rheea.

"The question now arises how is the Rheea to be cultivated? I have been advised to join a few capitalists to form a small Company; the capital required would not be great, and by following your example, going on quietly, I think would be the best plan, as it must be done with determination, and without fearing to lose a few hundred pounds at the outset. At all events I will await your next shipment, as it is in the capacity of importer that I think we should stand and let our larger manufacturers do the rest, precisely the same as is done in the flax and hemp market, of which between three and four millions pounds sterling worth is annually imported into England; only look at this enormous sum, and it seems perfectly ridiculous that we cannot import Rheea from India.

(True Copies)

(Sd.) H. VETCH.

Offg. Rev. Commr.

Correspondence and Selections.

THE PLANT YIELDING THE "RICE PAPER" OF CHINA.

Extract of a letter from J. C. Bowring, Esq., *of Hong-Kong, dated 15th August,* 1852, *to* Dr. F. J. Mouat, *Calcutta.*

You may perhaps have seen by the newspapers that we have, at length, succeeded in procuring living specimens of the plant from the pith of which the curious substance known as "Rice paper" is prepared, and as the subject may not be without interest to you and your friends, I avail myself of Capt. Turnbull's return to India to forward to you a small packet containing a few pieces of the said pith as it appears when the bark and wood are detached, and before it is prepared for cutting into paper.

I am not yet in possession of sufficient information to be able to explain exactly the process of cutting the paper, but it appears that these pieces of pith are first converted into cylinders (by what means we know not, but I possess one of the cylinders), and a sharp instrument being then employed, the cylinders are cut into thin sheets following the curve of the material which is thus, as it were, unrolled like a papyrus.

The general size of these cylinders, as exposed for sale, is three inches long and about one inch in diameter, yielding sheets of three inches square; these are used in enormous quantities by the Chinese for the manufacture of artificial flowers.

Of the live plants I procured, two have been forwarded to Sir Wm. Hooker, and two others go to England by the next mail steamer. I am in hopes of obtaining other specimens however, in which case I shall have much pleasure in sending one to the Botanical Garden at Calcutta.

THE TURAEE AS A GOOD LOCALITY FOR RAISING EXOTIC COTTON.

Extract of a letter from J. C. Wilson, Esq., C. S., *dated Moradabad, 17th September,* 1852.

I have just returned from examining my Cotton Plantation in the heart of the Turraee. We have had a very heavy rainy season, and there is an impression throughout the district, that when the rains are heavy, cotton plants in the Turraee are ruined by the wet. This I dare say is the case when the water is allowed to lodge about the roots of the plants, but so far from the heavy rains injuring my plants I never saw finer plants in my life. They are 5 feet high, and I am certain that they will give a large crop. I regret from the bottom of my heart, that I had no good seed to sow, and that my labor should have been thrown away on common country cotton; still, I have learnt something,—that the Turraee is the country in which American seed is most likely to succeed. There is always moisture enough to bring the plants to maturity, and this season proves that cotton can stand any amount of rain without injury.

GARDENING OPERATIONS AT SEALKOTE IN THE PUNJAUB.

Extract of a letter from CAPTAIN F. C. BURNETT, *dated Sealkote,* 12*th June,* 1852.

I was much pleased by your kind remembrance of me in sending the cuttings of *Poinsettia,* which arrived three days ago in excellent order. I have no doubt but that they will all grow, and even the yams that they were in are all throwing out roots, and will be an acquisition, for I have seen none of the sort up here. There is a great taste for gardening at this best of stations, and the soil is most favorable. The only fruit trees that have come up of those you sent me are 8 Strawberry, 2 Vine, 1 Mulberry, and some Walnuts; the others take a much longer time, and may germinate in the rains. I found not above 1 per cent of the Cotton and Maize germinated. I hope soon to receive the South Australian seeds you have promised me. I have plenty of Fuchsias of sorts, and Geraniums grown from seed, and I have some large Lavender Plants in flower, which is unusual I believe. This is a good place for Strawberries, I hear of gardens yielding 2 and 3 seers daily; the common Peach here is the flat China Peach. I cannot get the Teak seed to germinate here. I have very fine Beet roots; I find that by sowing a crop in March, I have it during the whole of the hot season; this is I believe not generally known, as it is looked upon as a cold weather crop; Mangel Wurzel would do well here, but the natives never feed their cattle on roots. My garden is very gay now with Asters from Cashmere, and originally, I suppose, from China; also Convolvuli, Balsam, Petunea, &c.

Sealkote: 5th August, 1852.

Yours of the 22nd July reached me three days ago, and the seeds of the *Victoria regia* arrived this morning, for which accept my very best thanks. I hope they will germinate; if so, I intend to introduce them to the Lake of Cashmere, in which a great variety of Lotus flourish. The Australian seeds are also in the ground. I am sorry to say that all the *Poinsettias* died after throwing out healthy shoots, so I despair of succeeding with them. I attribute their death to the very damp hot weather we have had lately. I never saw such heavy rain in my life, 9 inches fell in about 6 hours. I am sorry I cannot send you any seeds of the *Fuchsias*. I had about 20 plants well up, but they all perished from the same cause that killed the *Poinsettias*. I received the seeds from Dr. Jameison, and I have no doubt you could obtain a supply by writing to him; there were two sorts. I said in my last letter that I could not get the Teak seeds to germinate though five months in the ground, and at Jullundur they all came up within 3 months; I find now that one has germinated. I have seen in the District some very promising fields of Cotton from the seed you sent me to Peshawur; the natives are much pleased with it.

AGRI-HORTICULTURAL OPERATIONS AT LEIA ON THE INDUS.

Extract of a letter from Capt. G. E. Hollings, *dated* 13*th Sept.* 1852.

The supply of American vegetable seeds reached me this morning; I have little doubt of their proving as good as usual. We had splendid Artichokes (large globe) last year, and have established Asparagus beds; in fact all the vegetables have been excellent except the Celery. None of the fruit-stones and seeds you sent me have germinated yet, nor have I had better success with some that I received from Lucknow and from England. I will go on sowing at intervals of a fortnight and shall hit the proper time and method at last. The Cotton plants from American seed promise very well; they are just coming into blossom and bearing. I think the Punjab will be found a good Cotton producing country; the seed is sown the end of March or beginning of April, and the Cotton gathered in November and December. The natives adopt exactly the same plan as the Americans do regarding planting, watering, ploughing, manuring, &c., &c. There are some promising fields of indigenous Cotton of which I will send you good samples in time. Do not lose any opportunity of sending me fruit-stones or seeds of any kind, and also seeds of flowering shrubs. I have the finest collection of Convolvolus in full flower that I have ever seen; but I have apparently lost the blue and scarlet Ipomea; at least it has not come up yet; there is however no occasion to despair, for in this country seeds self-sown remain in the ground without injury until the period of germinating arrives. No English flower that has borne seed has ever been lost. I can send you seeds of Melons—musk and water —grown in this part of the world, and also of the Tobacco, if they would be acceptable. I have also got some round wheat grown from seed said to have been brought by a pilgrim from Mecca. I could give you some of the acclimated American Cotton seed; I have had small quantities sown in different places and in different kinds of soil; as we have had a favorable season it may happen that useful results may be deducted from the experiments.

P.S.—I have several specimens of Mŭddār fibre and thread much better than those I sent to Calcutta, but do not send any as the season is approaching when they say the fibre attains perfection and is most fitted to be manufactured. I will send you specimens.

REPORT ON ENGLISH BULBS RECEIVED FROM THE SOCIETY.

Extract of a letter from LIEUT.-COLONEL GEO. CONGREVE, C. B., H. M. 29*th* REGIMENT, *Dinapore, dated* 17*th August*, 1852.

I have the pleasure to inform the Society that nearly the *whole* of the English bulbs received by me last autumn, when at Meerut, germinated and flourished remarkably well. Some of the Hyacinths were placed in *glasses*, which did not do so well as those in *pots*; all of the other bulbs were planted in pots. It was very late in the season when I received them, and consequently I had not the satisfaction of seeing them all in flower, my Regiment having been most unexpectedly ordered down to this station,—Dinapore. The Hyacinths and Crocusses were in flower when I left, and considering the lateness of the season when planted, and the proverbial coldness of the winter at Meerut, I had every reason to be well satisfied with the result. The *Tulips* promised most favorably, and were showing buds.

REPORT ON SEEDS RECEIVED FROM THE SOCIETY.

Extract of a letter from DR. JOHN MAITLAND, *Lingsoogur, viâ Muctul, dated* 12*th August*, 1852.

Of the large supply of flower seeds received last year, Antirrhinum, Balsam, Chrysanthemum, Escholtzia, Ipomea, Lupin, Martynia, Nolana, Wall-flower, Sweet Peas, Mignonette, and Sweet Williams alone vegetated. Escholtzia, Lupins, Sweet Peas, Wall-flower, and Sweet William have not flowered. Antirrhinum and Martynia threw out small flowers in December, but did not form seed. This year the flowers are much larger and seed is forming. I think therefore that most, if not all, the flower seeds should be sown by the end of July at latest. As none of the seeds which I kept have vegetated this year I have lost the best season.

The American vegetable seeds came up very well, and the Beetroot was far finer than any I have seen in India. The Cape seeds did not do so well, but this was perhaps owing to the soil not being properly prepared, in which they were placed.

HORTICULTURAL OPERATIONS AT BHAUGULPORE.

Extract of a letter from DR. JAMES ALLAN, *dated 7th September*, 1852.

I have had my first dish of peas a few days back, from seed sown about the 5th August; this is the earliest we have ever had here, and I am rather surprised at getting a crop, owing to the unfavorable state of the weather—viz., heavy rain and intense heat. I sowed them in ridges, but, as an experiment, left them totally uncovered. From this I think we might ensure regular crops of early peas by sowing in the middle of May, throughout June, July, and August; and this with the Beans, which you say ought to be sown at the end of May, would ensure us of a good supply of vegetables during those months when we are worst supplied.

I must try this year a new plan with the English flower seeds, as last year I succeeded but poorly; not more than two dozen kinds out of the number sent germinating, and those of the most common. I have had prepared a large hot-bed with its cucumber frame, and with this aid I trust to succeed better.

The seed from the different Squash of last year I planted this year about the end of July, and I have them now in flower and fruit just two months earlier than last year; the earlier Bush Squash seems to be very hardy.

Bhaugulpore: 8th November, 1852.

We are now as you may suppose in the full swing of gardening operations, and every thing in much greater advance than last year, as you may judge from the exhibition at our flower and vegetable shew which took place on the 29th October. Amongst the vegetables were seen, Peas, Cauliflowers, really beautiful specimens of various kinds of American Squash, Knolekol, large English Beet from seed you sent me, Onions, Eschallots, Tomatoes, Artichokes (Jerusalem), Lettuce and finer Radishes, both red and white, than I have ever seen in Covent Garden market. These principal vegetables have been all raised from English seed and prove that hitherto we have always sown too late in the season; it is true that we had no heavy rain during the October gale, but even if this had been the case, the vegetables were all so far advanced that, with common care, no damage to them could have occurred. I fancy that even in Calcutta you cannot be much more advanced than we are here.

On the Climate and Vegetation of the Temperate and Cold Regions of East Nepal and the Sikkim Himalaya Mountains. By J. D. HOOKER, M.D., F.L.S.—(*Reprinted from the* JOURNAL OF THE HORTICULTURAL SOCIETY OF LONDON, Vol. VII. Part 1, p. 69.)

Concluded from page 65.

It is now my purpose to enter into some details respecting the temperature and climate of the tree zones of the Sikkim Himalaya, to which the Rhododendrons are chiefly confined. The information on this head is not so satisfactory as is desirable, owing to the want of a series of observations having been continued throughout the year anywhere, except at Darjiling itself, and there but for a few hours daily through one year. The mean annual temperature of that locality at 7,000 feet may be considered as very nearly 53°, probably rather below than above it, this result being deduced from the daily maxima and minima, which, I think, gives too high a result, from local causes which I shall hereafter explain. The monthly means, on the other hand, vary much year by year, and with small differences of position, owing chiefly to the variable amount and unequal distribution of the rain-fall and cloud, and the great power of the sun's rays when unobstructed. The wonderful equality of temperature throughout the 24 hours from May till October, is only disturbed by the sun's rays, which raise the thermometer 20° in a very few minutes, and sometimes for an equally short period of the whole day. During the height of the rains the mean temperature varies but a few tenths of a degree (June 61·2°, July 61·4°, August 61·7°), and there is no radiation by night of any consequence. Whilst, therefore, a short sunshine raises the thermometer for a few minutes 10° above the mean of the 24 hours, the minimum thermometer never falls more than 3° to 4° below the same mean, whence it follows that the mean of the whole day cannot be indicated by that of the maximum and minimum, as shown by a self-registering thermometer. Again, the maximum of heat occurs during the rains very generally before noon, often before 10 A.M., the forenoon being the least cloudy part of the day, and the fogs that obstruct the sun's rays afterwards being both denser and of much greater perpendicular height than is supposed usual with this phenomenon. Cloudless afternoons are very rare in any month, and quite unknown during the warm ones, so that the mean yearly temperatures of 10 A.M. and 4 P.M. coincide within half a degree (10 A.M. 56·2°, 4 P.M. 56·7°), differing as much as 2° in the month of February only. In the cold weather, again, the maximum occurs in the afternoon. The mean temperature of the year coincides nearly with the 8 A.M. temperature, as far as I can ascertain.

My own observations were taken hourly at Darjiling, for, on the average, 18 hours of the day, during the rainy season of 1848, with many breaks however. From the end of October, 1848, to the latter part of January, 1846, I was travelling in East Nepal and in Sikkim between the elevations of 4,000 and 17,000 feet. January, February, and April of 1849, I spent near Darjiling; March on the plains at the foot of the hills. From the beginning of May till Christmas, 1849, was wholly spent in travelling at all elevations above 4,000 feet, and chiefly in regions above 6,000 feet, for several months between 12,000 and 14,000 feet; during September at 15,400 feet, and in October I spent a few days at 16,700 to 17,000 feet. The spring of 1850 (January to May) was passed in and about Darjiling. During all these excursions I made the study of climate second alone to botany. I recorded observations at certain hours, which were those adopted at the Calcutta Observatory (5° due south of Sikkim), and at many of which hours my friend, J. Muller, Esq., made comparative observations of pressure, temperature, and wet-bulb at Darjiling. My first proceeding, after halting or camping, was to hang the instruments in a very accessible place screened from radiation; and I endeavoured to observe hourly, when at liberty to do so; isolated observations in such circumstances being generally useless. I have taken the results of the comparision of a multitude of such observations, with coincident ones at Calcutta and Darjiling, as the basis of my calculations for the temperature, &c., of the zones above 7,000 feet, checking them by various methods that suggested themselves. The computations in many cases are excessively complicated and laborious, but during my stay in Sikkim I was materially assisted in this, as well as in the preliminary calculation of several hundred altitudes by barometer, by Mr. Muller, the experienced accountant of the Calcutta Mint, to whose friendship I am very largely indebted, and but for whose generous aid and encouragement I should perhaps never have undertaken the distracting task of working out general results from the materials I accumulated. These broken series of comparative observations have, if sufficiently numerous, a value when properly reduced, and are indispensible to the horticulturist; they give, within certain limits, the difference of temperature due to the difference of altitude for the month in which they are taken; and if a few days of several months, or a considerable portion of either equinoctial month (March or October), are spent at one place, the results give useful approximations to the mean annual temperature.

The results thus obtained have been checked by ground temperature, taken by burying a brass tube 2 feet 6 inches to 3 feet in exposed soil, sinking in a slip of wood, a thermometer whose bulb is well padded with wool. This, after a few hours, indicates the temperature of the soil, which has a definite relation to the mean temperature of the month, and further, has an obvious practical application to the growth of plants. Such a tube and thermometer I usually caused to be sunk wherever I halted, if even for one night, except during the height of the rains, which are so heavy that they communicate to the earth a temperature sometimes above that of the air. I cannot too confidently recommend this simple plan to travellers, for the double purpose of getting an approximation to the mean monthly temperature by a few observations, and of finding that of the soil. One such observation is worth a hundred of such as are paraded in the works of travellers, as taken with a thermometer hung inside a tent, or to a tree, &c., the majority of which are not worth recording. With regard to other observations, the wet bulb and barometer were invariably registered with the temperature, and minimum spirit thermometer set every night. Of maximum thermometers I tried many, but never kept one long in working order. A radiating thermometer in a parabolic reflector, and others placed on cotton and grass, were frequently exposed, and I found no material difference between that laid on cotton and that in the reflector. The black-bulb thermometer was often observed, and a large series of actinometer observations taken; these have not been computed, nor the dew-points from the wet-bulb temperatures, the correction (p-f′) always required at considerable elevations being laborious. I have, however, computed as many as to convince me that the cultivator may assume the mean state of humidity given for Darjiling, which I have computed (on monthly means of 1,835 observations), as applicable to both the upper zones—the difference of humidity between 7,000 and 14,000 feet being that the excessive rain-fall of the lower station and great capacity for moisture of the lower warmer strata, do not extend proportionally to the upper, whose cooler atmosphere, however, holds less vapour in suspension. In all three zones the atmosphere is generally well loaded with humidity.

Distribution of Temperature in the Three Zones.—A remarkable uniformity prevails throughout the year at the lower zone, there being, at 7,000 feet, but 22° difference between the mean temperatures of the hottest and coldest months; whilst in London, with a lower mean temperature, the equivalent difference is 27°. In the second (middle zone) at 11,000 feet this difference is equal to that of London. In the upper it is still greater, the climate becoming excessive at 15,000 feet, where the difference amounts to 30° at least.

Between 6,000 and 10,000 feet, *i. e.* throughout the first zone, I find the mean annual temperature decreasing with the elevation at the rate of 1° to every 320 feet.

Between 10,000 and 14,000 feet at one 1° to every 350 feet

And between 14,000 and 18,000 feet at 1° to every 400 feet.

This gives—

Altitude.	Mean Shade.	Mean Warmest Month.	Mean Coldest Month.	Mean Daily Range of Temperature.	Rain-fall in inches.	
11,000 feet, ..	40·9	50·0	24·0	20·0	40·0	1°=320 feet.
15,000 feet, .	29·8	40·0	11·0	27·0	20·0	1°=350 feet.
19,000 feet, ..	19·8	32·0	0·0	35·0	10·0	1°=400 feet.

15,000 feet being the limit of perpetual snow where that phenomenon advances farther south in Sikkim, and 19,000 feet the limit of perpetual snow in Tibet. Supposing the same law to apply (which I exceedingly doubt) to heights above 19,000 feet, 2° would be the mean annual temperature of the summit of Kinchinjunga, altitude 28,178 feet, the loftiest known spot on the globe.

The upper limit of phenogamic vegetation coincides with a mean temperature of 30° on the south flank of Kinchinjunga, and of 22° in Tibet; in both cases animals and perennial-rooted herbaceous plants are to be found at elevations corresponding to these mean temperatures, and even at higher elevations in sheltered localities. I have assumed the decrease of temperature for a corresponding amount of elevation to be gradually less in ascending (1°=320 feet at 6,000 to 10,000 feet, and 1°=400 feet at 14,000 to 18,000 feet). My observations appear to prove this, but I do not regard them as conclusive; supposing them to be so, I attribute it to a combination of various causes, especially to the increased elevation and yet unsnowed condition of the mass of land elevated above 16,000 feet; also to the greater amount of sunshine there, and to the lesser density and height of the fogs which obstruct the sun's rays at all elevations. In corroboration of this, I may mention that the difference of temperature is much less in summer than in winter, 1° of Fahr. being equivalent to only 250 feet in January between 7,000 and 13,000 feet, and to upwards of 400 feet in July. Again, at Darjiling (7,500 feet) the temperature hardly ever rises above 70° in the summer months, yet it often rises even higher in Tibet at 12,000 to 14,000 feet. On the other hand, the winters, and winter-nights especially, are disproportionately cold, the thermometer falling upwards of 40° below the Darjiling temperature at 6,000 feet above that elevation.

The diurnal distribution of temperature is equally and similarly affected by the presence of vapour in the three different zones. The lower zone is first clouded, because the lower ranges, of 6,000 to 10,000 feet, first receive the diurnal charge of vapour-loaded southerly winds; the middle gets more of the sun's rays, and the upper more still. Though the summer days of the upper zone are warmer than their elevation would indicate, the nights are not proportionally colder; for the light mist of 14,000 feet, which replaces the dense fog of 7,000 feet, effectually obstructs nocturnal radiation, though it is less an obstacle to solar radiation. Clear nights, be it observed, are as rare at 14,000 as at 7,000 feet, the nights being rainy, if windy; or if calm, cold currents descend from the mountains, condensing the moist vapours of the valleys, whose narrow floors are at sunrise bathed in mist at all elevations in Sikkim. The rise and dispersion of these dense masses, and their collection and recondensation on the mountains in the morning, is one of the most magnificent phenomena of the Himalaya, when viewed from a proper elevation; it commences as soon as the sun appears on the horizon.

The mean daily range of the thermometer at 7,000 feet is 13° in cleared spots, but considerably less in wooded, and certainly one-third less in the forest itself. At 11,000 feet it amounts to about 20°, and at 15,000 feet to 27° (London 17·5°). These values vary widely in the different months, being much less in the summer or rainy months.

At 7,000 feet	it amounts to	8°–9°	in Aug. and	Sept., and	17°	in Dec.
11,000	„	12°	„	„	30	„
15,000	„	15	„	„	40	„
London	„	20	„	„	10	„

Temperature of the Earth.—This, at 2½ to 3 feet depth, varies with the temperature of the month, but is hardly affected by the diurnal variation, except in extreme cases. In summer, throughout the rains, May to October, the temperature is that of the month, which is imparted by the rain to the depth of 11 feet during severe continued falls (of 6 to 12 inches a day), on which occasions I have seen the buried thermometer indicating a temperature above the mean of the month. Again, in the winter months, December and January, it stands 5° above the monthly mean ; in November and February 4° to 5° ; in March it is a little below the mean temperature of the month, and in October above it; April and May being sunny, it stands above their mean temperature ; June to September a little below the mean temperature of each respectively.

In the middle and upper zones the sunk thermometer always stands considerably above the mean of the month, the sun's rays being more powerful and frequently felt, the rain less ; and the earth, being cooled less by nocturnal radiation than it is warmed by solar, accumulates heat to a certain depth. Thus in January, at 13,000 feet, I have found it 17° above the mean temperature, though the soil was frozen hard for 16 inches ; and in July, at the same elevation, 7·5° above the mean temperature. In August I have seen it + 8° at 12,000 feet, in September + 7·4° at 15,400 feet, and in October + 12° at 16,800 feet ; in July + 7·6° at 12,800 feet, and in October + 10·5° at the same spot ; in December + 9° at 13,500 feet with several inches of frozen soil. It is probable that the intense winter cold of the upper zone does not materially affect the soil at 3 feet depth, for there is always a sufficiently deep covering of snow after the second week of January to protect the soil from excessive cold.

Solar Radiation.—From a multitude of desultory observations with the black bulb thermometer, I conclude that at 7,000 feet, 67° above the temperature of the air is the average maximum effect of the sun's rays on a black bulb thermometer[*] throughout the year, amounting rarely to + 70° and + 80° in the summer months, and more frequently in the winter. These results, though greatly above what are obtained at Calcutta, are not much, if at all, above what prevail at the foot of the hills, and up the Gangetic valley. This effect is greatly increased with the elevation At 10,000 feet, in December, at 9 A.M., I saw it mount to 132° with a diff. of + 94°, whilst the temperature of shaded snow hard by was 22° ; at 13,100 feet, in January, at 9 A.M., it has stood at 98°, diff. + 68·2°, and at 10 A.M. at 114°, diff. + 81·4°, whilst the radiating thermometer on the snow had fallen at sunrise to 0·7°. In December, at 13,500 feet, I have seen it 110°, diff. + 84° ; at 11 A.M., 11,500 feet, 122°, diff. + 75°. In November, 9 A.M., at 13,500 feet, 112°, diff. + 82°. This is but a small selection from many, of the extraordinary power of solar radiation in the coldest months at great elevations. It is accompanied by a great increase of solar light, as I found by means of the black glass photometer.

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[*] From the mean of very many observations I find that 10° is the average difference between two otherwise equal and similar white and black bulb thermometers at the level of the sea.

Two phenomena particularly obstruct the solar light and heat—the clouds and fog from the end of May till October, and the haze from February to May. On the former I have dwelt sufficiently at length. Two months alone are usually clear, one before and one after the rains, when the air, though still humid, is transparent. The haze has never been fully explained, though a well-known phenomenon. On the plains of India, at the foot of the hills, it begins generally in the forenoon of the cold season, with the rise of the west wind, and, in February especially, obscures the sun's disc by noon ; frequently it lasts throughout the 24 hours, and is usually accompanied by great dryness of the atmosphere. It gradually diminishes in ascending ; it cannot be said to prevail at 7,000 feet, and I have never experienced it at 10,000. At 7,000, however, it very often, in April, obscures the snowy ranges 30 miles off, which are bright and defined at sunrise, and either pale away or become of a lurid yellow-red, according to the density of this haze, as they disappear at 10 A.M. I believe it always accompanies a S.W. wind and dry atmosphere in Sikkim.

Nocturnal Radiation.—This is even a more difficult phenomenon for the traveller to estimate than solar radiation, the danger of exposing instruments at night being always great in wild countries. I have used the parabolic reflector and white cotton most frequently, and find no material difference in the means of many observations of each, though often 1° to 2° in individual ones. 'Avoiding radiation from surrounding objects is very difficult, especially in wooded countries. I have also tried the radiating power of grass and the earth ; the latter generally is lower, the former higher than the thermometer exposed on cotton or in the reflector, but much depends on the surface of the herbage and soil. Snow radiates the most powerfully of any substance I have tried ; in one instance, at 13,000 feet, in January, the thermometer on snow fell to 0·2°, which was 10·8° below the temperature at the time, grass showing 6·7°, and on another occasion to 1·2°. when the air at the time (before sunrise) was 21·2°, and the difference 20°. I have frequently made this observation, and always with a similar result ; it may account for the great injury plants sustain from a thin covering of ice on their foliage, even when the temperature is but little below the freezing point.

The power of terrestrial radiation increases with the elevation, as does solar radiation, but not in an equal proportion. At 7,000 feet there is little radiation during the rains ; the nights are almost invariably cloudy—3° to 4° is the mean maximum, but it is not on one night out of six that there is any radiation. From October to December the amount is greater=10° to 12°, and from January till May greater still, reaching 15°. During the winter months the effect of radiation is often felt throughout the clear days, dew forming abundantly at 4,000 to 8,000 feet in the shaded bottoms of narrow valleys, into which the sun does not penetrate till 10 A.M., and from which it disappears at 3 P. M. I have seen the thermometer in the reflector fall 12° at 10 A M. in a shaded valley. This often produces an anomalous effect, causing the temperature in the shade to fall after sunrise ; for the mists which condense in the bottoms of the valleys after midnight disperse after sunrise, but long before the sun reaches the valleys, and powerful radiation ensues, lowering the surrounding temperature. A fall of 1° to 2° after sunrise of air in the shade is hence common in valleys in November and December. The excessive radiation of the winter months often gives rise to a curious phenomenon ; it causes the formation of copious dew on the blanket of the traveller's bed, which radiates to the tent roof, and this inside an open or closed tent. I have experienced this at various elevations, from 6,000 to 16,000 feet. Whether the minimum temperature was as high as 50° or but little above zero, the effect is the same, except that hoar frost or ice forms in the latter case. Another remarkable effect of nocturnal radiation is the curl of the alpine Rhododendron leaves in November, which is probably due to the freezing and consequent expansion of the water in the upper strata of cells exposed to the sky. The first curl is generally repaired by the ensuing day's sun, but after two or three nights the leaves become permanently curled, and remain so till they fall in the following spring.

Many alpine plants resist a great degree of radiation ; the *Cyananthus*, especially, I have observed to be uninjured by a minimum temperature of 31·0° lowered 12·0° by radiation, in the month of September, at 15,500 feet ; and yet this is one of the most delicate as well as beautiful of Himalayan blossoms. As a general rule, however, the commencement of the September and October radiation is the signal for the extinction of the alpine herbaceous vegetation.

I have elsewhere said that the nocturnal radiation of the English spring months is the great obstacle to the cultivation of many Himalayan plants ; it is not hence to be inferred that there is no similar amount of radiation in the Himalaya, for, on the contrary, in April its amount is much greater than in England, equalling 13° of difference frequently, and I have seen 16° at 7,500 feet; but the minimum temperature at the time is 51°, and the absolute amount of cold hence immaterial. The mean minimum of London is 38·0°, and when lowered 5·5° by radiation the consequent cold is very considerable. Mr. Daniell, in his admirable essay on the climate of London (the perusal of which first gave me an interest in these pursuits), mentions + 17° as the maximum effect of nocturnal radiation ever observed by him; I have had + 20° from the surface of snow, and I have registered + 13·0°, + 14·0°, + 15·5°, and + 16·0° in April at Darjiling; nearly as much at 6,000 feet in February; once + 12·0°, twice + 13·0°, and once + 14·2° in September at 15,500 feet; + 10° in October at 16,800 feet; + 11·0°, + 12·0°, and nearly + 13·0° in January at 7,000 feet; + 10° to + 14·5° repeatedly in February at that elevation, and + 12° to + 14·7° at 10,000 feet in November on several occasions.

To conclude, though nocturnal radiation does occur frequently, and has on the whole a much more powerful effect in Sikkim than in England, I doubt if the mean effect of all the months in Sikkim would equal that of London, from so many more nights being cloudy, which cloudy atmosphere, and the comparatively high temperature of the nocturnal radiating months are what a Himalayan vegetation wants in England.

Winds.—Of the Himalayan winds there is little to be said affecting the horticulturist. The southerly moist, warm current is perennial, except during the spring months, when occasional S. W. squalls or moderate day winds blow. The nights are usually calm, or return cool winds sweep gently down the valleys. The northerly winds are said to bring snow; in December to February they appear to me to be local phenomena, and are under currents from the snowed regions, which condense and freeze the lower strata of the main current. Heavy gales occur at the equinoxes in the Himalaya as all the world over, but I have never experienced cyclones or hurricanes. Midsummer and midwinter are also generally characterised by storm and rain.

Atmospheric Pressure. It has long been surmised that an alpine vegetation may owe some of its peculiarities to the diminished atmospheric pressure; and that the latter being a condition which the gardener cannot supply, he can never successfully cultivate alpine plants in general. I know of no foundation for this hypothesis; many plants, natives of the level of the sea in other parts of the world, and some even of the hot plains of Bengal, ascend to 12,000 and even 15,000 feet on the Himalaya, unaffected by diminished pressure. Any quantity of species from low countries may be cultivated, and some have been for ages, at 10,000 to 14,000 feet, without change. It is the same with man and the lower animals; innumerable instances may with ease be adduced of pressure alone inducing no appreciable change, whilst there is an absence of any proof to the contrary. The phenomena that accompany diminished pressure are the real obstacles to the cultivation of alpine plants, of which cold and the excessive climate are perhaps the most formidable. Plants that grow in localities marked by sudden extremes of heat and cold are always very variable in stature, habit, and foliage. In a state of nature we say the plants "accommodate themselves" to these changes, and so they do within certain limits; but for one that survives of all the seeds that germinate in these inhospitable localities, thousands die. In our gardens we can neither imitate the conditions of an alpine climate, nor offer others suited to the plants of such climates.

Light.—The plants of the different zones are very differently situated with regard to this element. The forest region, which so uniformly extends to 12,000 feet, shuts out much light from the plants that grow in it, and such are generally pale-coloured or white,—as, amongst rhododendrons, R. *Hodgsoni*, R. *camelliæflorum*, R. *argenteum*, R. *Falconeri*, &c., &c. On the other hand, many of the most gorgeously coloured ones abound in the sunniest and lightest spots, as R. *fulgens*, R. *arboreum*, R. *Thomsoni*. Still it must be recollected that many species eminently abundant in the sunniest exposures are pale flowered, as R. *Wightii*, R. *campylocarpum*, R. *lilacinum*, and R. *Griffithii*; and that some gorgeous species are very frequent in deep woods, as R. *arboreum* itself, R. *Thomsoni*, R. *barbatum*, R. *cinnabarinum*, and that their colour is materially lessened, except the shade be unnaturally deep It is hence difficult to appreciate the direct influence of sunlight on the individual plants in the Himalaya. If, on the other hand, we compare all the species as there existing, with their congeners in higher latitudes, it becomes evident that the balance in favour of gorgeous colouring is greatly on the side of the Himalaya; which renders it probable that the more direct sun's beam of lat. 26° to 28° has an influence which its slanting rays in high latitudes have not. This is a very interesting subject for future investigation; it cannot be satisfactorily dealt with, except by accurately estimating the number of coloured species in two well-marked localities. One remarkable fact has already come prominently before me, which is, that the R. *ciliatum*, now flowering abundantly at Kew, has larger blossoms than I ever saw it to have in the Himalaya, but of a paler hue by far than any of the red-coloured series in Sikkim, except R. *anthopogon*,—judging from colour alone, I should not have recognised it. May is its flowering season in its native locality, and a purplish red the colour I have been accustomed to see it.

Sikkim Climate as compared with London.—The colder winters and warmer summers are the prominent differences of the London climate, as the following comparison shows:—

	Mean Temp.	July.	January.	Range.	Mean Max.
London	50·0	63·2	36·0	27·2	71·0
Darjiling	53·5	61·4	40·0	21·4	65·3

	Mean Min.	Extreme Max.	Extreme Min.	Extreme Diff.
London	34·2	94·0	–4·5	98·5
Darjiling	38·2	71·0	25·5	46·5

The extreme Darjiling data given here are not low enough for the minimum, or high enough for the maximum; but they give a sufficient approximation. At 10,000 to 11,000 feet, where most species of rhododendrons grow, the climate in its main features of great extremes approaches nearer to the English; but the mean temperature (40°) is too low. Our summers are much too hot for the plants of that elevation, and our winters being too mild, they make shoots earlier in spring than in the Himalaya, which are cut off by frosts in April. Though the temperature is more uniform in Sikkim, it presents one curious anomaly, which is, that an accession of 8° of temperature occurs in March, above February, the parallel of which does not occur till June in England, which is 8° warmer than May. This brings the rhododendrons so early into flower at 7,000 feet, and keeps the radiating thermometer always above freezing for the rest of the spring.

Again, there is in London nearly 20° of average difference between the day and night temp. of April, and 22° in May,—months wherein 15° and 13° are the corresponding Darjiling differences. This is a very powerful obstacle to the cultivation out of doors of many otherwise very hardy Himalayan plants, which are impatient of sudden changes, and incapable of bearing sudden, sharp frosts in March and April.

As the flowering season advances and fruit-setting comes on, the temperature in Sikkim becomes more markedly uniform, the mean difference between day and night being, in May, 13°; June, 11°; July, 10°. In London it is not so: May, 22°; June, 21·6°; July, 21·6°. Turning again to the autumn solstice, the sudden fall of temperature occurs both in Sikkim and London in November, and amounts in each to upwards of 7°; but whereas the difference between day and night is increasing in Sikkim, it decreases in London, a circumstance which may affect the ripening of seed, by checking the vegetative organs.

I have here taken the Darjiling elevation of 7,000 feet as the standard of comparison between the Himalaya and London, and of course it is understood that I here speak of the cultivation of species of that zone; but as most of the Himalayan plants have a range of fully 3,000 feet, which equals a mean annual difference of temp. of about 10°, it follows that localities with a mean annual temp. of 46° to 56° are in that one respect suited to the cultivation of species of the lower zone. It must also be borne in mind, that the temperatures are less uniform above 7,000 feet in Sikkim, than at that particular elevation where the maximum of moisture prevails.

Seasons, general remarks on.—These, throughout the Himalaya, partake more or less markedly of the hot and cold, or wet and dry of the plains of Bengal, with this exception, that the dry westerly wind which sweeps across the plains during many of the winter months is scarcely felt in Sikkim, or in the afternoon only in occasional puffs from the S. W. The southerly wind blows steadily from May till November, but is not uniformly moist at all seasons; it attains its maximum of humidity in July and August, when, being warmest, its capacity for transporting moisture is also greatest. From November till April, calms and light winds prevail, with occasional gales. Electric disturbances are most frequent from March to May, and again at the end of the rains; they are however almost wholly confined to the foot of the hills and outer ranges.

The rainy season commences with a spring fall in April or May, which is the flowering season of all the rhododendrons, and of most of the lower zone (7,000 to 10,000 feet). A remarkable uniformity of humidity and temperature now prevails at all elevations, till the fruiting season, which occurs in September at the upper zone, in October in the middle, and November and December in the lower zone. The rains have fairly "set in" by the middle or end of May, and the rhododendron flowers are withered within a month of their flowering, that is, by the beginning of June in both lower and middle zone, and but little later above 14,000 feet; for though they bud so late in the alpine regions, vegetation proceeds there much more rapidly.

In the upper zone May is the budding month, and the resinous scales that envelope the rhododendron flowers are no sooner thrown off than the leaves are expanded, and the flowers follow with that rapidity which is so characteristic of an arctic spring, and indeed of all excessive climates.

The distribution of the seasons in the three zones is very peculiar, and gives rise to some anomalies that have puzzled naturalists. From the middle of October to that of May, vegetation is torpid above 14,000 feet, and indeed almost uniformly covered with snow. From November till the middle of April, vegetation is also torpid in the middle zone (above 10,000 feet), except that a few trees and bushes do not ripen all their seeds till December. The three winter months (December, January, and February) are all but dead in the lower zone (above 6,000 feet), the earliest appearance of spring at Darjiling (7,000 feet) being at the sudden accession of heat in March. From May till August the vegetation in each zone is (in ascending order) a month behind that below it; 4,000 feet being about equal to a month of summer weather in one sense. I mean by this, that the genera and natural orders which flower at, say 8,000 feet in May, are not so forward at 12,000 feet till June, nor at 16,000 feet till July. After August, however, the reverse holds good; then the vegetation is as forward at 16,000 feet as at 8,000 feet. By the end of September most of the natural orders and genera have ripened their fruit in the upper zone, though they have flowered as late as July; whereas October is the fruiting month at 12,000, and November below 10,000 feet.

The Rhododendrons offer good instances of this:—

16,000 to 17,000 feet R. *nivale* flowers in July; fruits in September.
13,000 to 14,000 feet R. *anthopogon* flowers in June; fruits in October.
11,000 to 12,000 feet R. *campanulatum* flowers in May; fruits in Nov.
8,000 to 9,000 feet R. *argenteum* flowers in April; fruits in December.

And so it is with many species of *Compositæ* and *Umbelliferæ*, and indeed of all natural orders, some of which I have on the same day gathered in ripe fruit at 13,000 to 14,000 feet, and found still in flower at 9,000 to 10,000. The brighter skies and more powerful and frequent solar radiation at the greater elevations, account for this apparent inversion of the order of nature.

I shall conclude this long essay with some notices of the vegetation of the months in the three zones specified, assuming the elevations of 7,000 feet, 11,000 feet, and 15,000 feet, as typical of the three. I shall commence with March, which begins the new year as far as vegetation is concerned at 7,000 feet.

March.—In the lower zone, in which alone vegetation is active, the mean temperature is 50·7°, or 3° below the mean of the year, and 8° to 9° warmer than February. The mean maximum is 58·4°; 68° is the extreme temperature attained in the shade, and 120° in the sun, from my very insufficient data for solar radiation in this month. The mean minimum is 43°; the greatest cold 37°, and when aided by radiation 27·8°; with a maximum difference of 9° between the minimum thermometer and radiating one. The mean daily range is 15° to 16°, and the thermometer at 3 feet depth stands at 50°. The dew-point is 45·8°; the mean humidity 0·8° to 0·9°, and the rain-fall about an inch, which generally comes in heavy showers of rain and hail, sometimes of sleet at the equinoxes.

This is eminently the spring month at Darjiling. Laurels and maples bud and leaf, together with many other trees, but not oaks. The ground is often covered with the long leaf bracts of the *Tetrantheras*. The large white *Michelia* flowers, Cherry abundantly, white *Rhododendron (argenteum)* and the scarlet *(arboreum)* in sunny spots. An early leafless *Cælogyne* is common on the rocks *(C. præcox ?)*, the small blue gentian covers the ground on grassy banks, with the yellow *Fragaria Indica*, *Tormentilla*, a few violets, a pretty blue *Mazus*, and some few *Rubi*. The *Michelia*, cherry, and rhododendrons are, however, the only conspicuous plants of this season and elevation, with a pretty *Disporum* in the woods. In the garden peaches are in full flower, and many plants of the cold season of India, such annuals especially as belong to too cold or dry a climate to survive the damp heat of May and June if sown then—stocks, for instance. Most other garden flower seeds and bulbs are planted now, as well as vegetables; the young plants sown previously require transplanting and protection from the hail, which occasionally cuts up tender plants terribly. Potatoes are planted out. Table vegetables are still abundant of the ordinary kinds. Insects commence their attacks on the gardens.*

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* I am indebted to my friend Dr. Campbell, the Superintendent of Darjiling, for most of the garden memoranda of the month.

April.—Mean temperature 56° ; of maxima 64°, and minima 48° ; extremes 68° and 38°. Extremes of radiation—solar 125°, terrestrial 33°. Extreme differences—solar 66°, terrestrial 16°. The mean daily range is nearly 16° ; sunk thermometer 60° ; dew-point 50° ; and saturation 0·80°. Rain 2·5 inches.

Most of the trees leaf, and many flower in this month, as laurels, oaks, chesnuts, *Hydrangea*, birch. The smaller blossomed *Michelia* and the large magnolias flower in profusion, and the woods at 8,000 to 9,000 feet in some years look mottled with their great white and red flowers. Maple leaves are broad and red. Birch hangs its catkins. Some pretty and conspicuous shrubs flower, as *Adamia cyanea*, a *Viburnum*, white honeysuckle, the beautiful purple *Stauntonia*, several white and pink *Rubi*, a very sweet *Daphne* in the woods (of which paper is made), and the curious genus *Helwingia*. On the ground *Arisæmas* appear in profusion, and many other herbaceous plants leaf, as *Aralia*, *Paris*, and *Polygona*. Yellow strawberry, *Tormentilla*, violets, and the ground-raspberry are common, with several *Dispora*, *Ophiopogon*, *Melissa parvifolia*, and *Isopyrum* ; beautiful white-flowered leafy *Cœlogynes* adorn the moist rocks, which, with a very fine *Cymbidium* on the trees, are common at and above 6,000 feet.

Little is doing in the garden more than was in March ; sowing and planting out go on with activity. English strawberries flower abundantly, as do currants.

May.—Mean temperature 56·6° (only 1° above April). Means of maxima 65·3°, and of minima 50° ; extremes 69° and 38°. Extremes of radiation—solar 125°, terrestrial 40°. Mean daily range 13·3°, dew-point 50° ; saturation 0·91°. Rain 9 inches, falling in sharp showers late in the forenoon or afternoon of about half the days in the month. More falls in the night than in the day.

The botanist may reap a rich harvest in this month, the jungle and mountain plants between 6,000 and 10,000 feet coming into flower in rapid succession. Of these the trees are—

Yew (probably identical with English.)
Maples, various.
Apple and several *Pyri*.
Photinia.
Manglietia.
Lauri, various.

Symplocos.
Alder.
Large-leaved oak.
Hydrangea.
Saurauja.
Engleharditia.

Walnut.
Euonymus.
Myrsineæ, various.
Olea.
Podalyria.
Ash.

The great magnolias and michelias, and large white Rhododendron (*argenteum*), are all past flower.

Of shurbs there are many and beautiful species :—

Limonia.
Stauntonia.
White Rose (*Webbiana.*)
Sarcococca.
Aucuba.
Symplocos.
Gualtheria.
Vaccinia.
Rhododendrons.

Rubi, several (the yellow-fruited now abundantly ripe).
Indigofera.
Cotoneaster.
Adamia.
Smilax.
Ribes.

Woody climbers
Stauntonia.
Saurauja
Kadsura.
Sphærostemma.
Sabia.
Myrsineæ sp.
Holostemma.
Smilax.
Jasminum (white).

Herbaceous plants are common, but being annuals they are comparatively backward; the chief are—

Dentaria.
Viola.
Anemone.
Potentilla.
Fagopyrum.
Paris.
Trillium.
Euphorbia.

Androsace.
Tiarella.
Chrysosplenium
Ophiopogon.
Coriaria.
Fumaria.
Dielytra.
Corydalis.

Many and splendid *Arisæmas.*
Panax (2 herbaceous sp.).
Some fine *Hedychia.*
Roscoea.
Streptolirion.

A leafless purple *Cœlogyne* (*C. Wallichii?*) is abundant, and makes a gorgeous show on the trees, as do the white-flowered leafy species.

The gardens at Darjiling are very gay during this month—roses, poppies, snapdragons, heartseases, larkspurs, pinks, and lupines. Strawberries ripen, and continue in fruit for two months. The cucurbitaceous vegetables are planted, as melons, cucumbers, squash, &c. Those planted in autumn are now producing abundantly, as peas, French beans, salads, turnips, and cabbages.

Middle Zone.—In this region spring is only now established; much less rain (one-third less) falls above 10,000 feet, than at Darjiling. Snow occasionally sprinkles the forest, but what falls does not lie on the ground. On the other hand, the winter's snow, still abundant at 12,000 feet, is rapidly melting, and the rivers rise daily. The different pines, *Abies Webbiana*, *Brunoniana* and the larch flower, as do *Viburnum*, willow, and juniper. Very few herbaceous plants are advanced, of which the chief are a purple *Dentaria*, and some other *Cruciferæ*, primroses, *Anemone*, *Ranunculi*, a *Gentiana*, two large *Arisæmas*, a purple *Saxifraga* like *ciliata*, *Cotoneaster*, *Potentilla*, and *Podophyllum*.

Upper Zone.—So little snow falls here, comparatively speaking, that the passes even of 18,000 to 19,000 feet are open this month, but vegetation has made little progress, the soil being frozen in many places. Even the grass is not long enough to be cropped by cattle or sheep.

June.—Mean temperature (7,000 ft.) 61·2°; of maxima 66·7°, and minima 55·8°. Extremes 71° and 51·5°. Extremes of radiation—solar 126°, terrestrial 47°. Extreme differences—solar 62°, terrestrial 4·8°. Mean daily range of temperature, 11°. Mean dew-point, 59·5°; saturation 0·93°. Rain 26·964 inches (mean of 5 years—maximum 32·68 inches, minimum 12 inches), distributed, in 1849 (when 32·688 inches fell), over every day but 7, and every night but 3. Between sunrise and sunset 12·593 inches fell; during the night 20·035 inches. The showers, though heavy and frequent, do not combine to form a continuous down-pour at any time, and there is a good deal of sunshine from 8 to 10 A.M., and often at sunset also.

The flowering season of most of the trees at 7,000 feet is now over, but many shrubs blossom, as *Polygala*, *Xanthoxylon*, *Indigofera*, a *Magnolia* with white sweet-scented globe flowers, *Spiræas*, *Hydrangea*, yellow jasmine, various *Araliaceæ*, *Neillia*, *Leycesteria*, and shrubby *Polygona*; *Pyri*, many and shrubby; *Rosaceæ* generally; some laurels and *Viburna*, vines. Of herbs, balsams now appear prominently, with *Streptolirion*, *Gerania*, great-flowered *Aristolochia*, *Parochætus*, *Smilacina*, *Convallaria*, and *Dispora*; some fine *Scitamineæ*, *Parnassia*, *Potentilla anserina*, *Arum* and *Arisæmas*, *Monotropa*, *Pyrola*, *Pieris*, yellow *Crawfurdia*, *Iris*, *Campanula*, *Balanophora*, *Habenariæ*, and some curious terrestrial orchideæ, as *Cyrtosia*. Wild brambles are abundant, and several kinds are very good. *Elæagnus* berries ripen.

In the gardens the rains damage the unprotected flowers sadly. Cuttings are taken of rose, sweet-william, and pink. Such flowers as will blossom after the rains are now sown, as sweet-peas and lupines. Tulips flower, but not very well, as does the *Fuchsia*. Transplanting goes on actively. Table vegetables of all kinds are abundant and good, but flavourless.

Middle Zone.—I spent the greater part of this month above 11,000 feet, a little to the north of the position of Kinchinjunga, in well-wooded valleys, &c. The weather was uniformly cloudy, misty, and rainy; but the showers were never excessive, and only 6 inches fell, or one-half less than at Darjiling. The trees in flower are generally of the same genera as flowered at 9,000 to 10,000 feet last month, and the species are in many instances the same, as *Pyri*, birch, one oak, willow, a maple, holly (forming a bush); *Abies Webbiana* cones are a splendid purple, those of the larch red brown, and of *P. Smithiana* green; junipers form berries. A white cherry, Loniceras, *Symplocos*, and *Pieris*, are the chief flowering trees. Of shrubs there are other Loniceras, Potentillas, Rhododendrons, *Araliaceæ*, 2 currants, willows, *Andromeda*, *Gualthria*. Primroses are the glories of the herbaceous vegetation, appearing in profusion, yellow, white, and purple; beautiful anemones and ranunculi flower, with *Thalictra*, some *Berberris*, a splendid single-flowered *Mecnopsis*, several *Cruciferæ*, Tamarix (creeping), *Sibbaldiæ*, *Fritillaria*, *Orobanche*, small *Paris* and *Trillium*, *Pinguicula*, *Parnassia*, *Allium*, *Morina*, *Ophiopogon*, the great *Rheum*, *Juncus*, and *Luzula*. Rhododendrons many.

Upper Zone.—Towards the end of this month the grass is well grown in the valleys, at 13,000 to 16,000 feet, and the cattle are driven up to the grazing grounds. A few plants flower above 15,000 feet, as *Anemone*, *Primula*, *Astragalus*, *Parnassia*, and *Picrorhiga teeta*.

July—Mean temperature 61·4°; of maxima and minima 65·5°—57·3°, extremes 70°—56°. Extremes of radiation, solar 136°, terrest. 3·52°. Extreme differences, solar 62°, terrest. 3·5°. Mean daily range of temperature 8°. Dew-point 60·7°. Saturation 0·97°. Rain-fall 25·336 inches (mean of 5 years, maximum 33, minimum 17·915). In 1848, 21·605 inches fell; it rained every day but one, 12·22 inches per day, and 9·235 between sunset and sunrise, there having been 18 rainless nights, but only five occasions on which none fell between sunrise and sunset.

The beautiful scarlet *Buddleia* at 9,000 to 10,000 feet, and a fine *Erythria* at 6,000 to 7,000 feet, are the only remarkable trees I have noted as flowering during this month in the lower zone, except a *Sauranja*. Of shrubs, the chief are *Hyperica*, *Deutzia*, *Philadelphus*, *Neillia*, and many that flowered late in the previous month, together with the beautiful red rose. Herbaceous plants succeed one another rapidly; magnificent Balsams, *Cyrtandraceæ*, Begonias, *Scitamineæ*, and *Æschynanthus* abound, with *Mimulus*, *Torrenia*, *Campanula*, *Codonopsis*, *Thalictra*. The gigantic lily, and various terrestrial *Orchideæ*, as *Calanthe*, *Habenaria*, *Spathoglottis*, *Neottia*, and *Serapias*. *Epilobia* are common. *Circeæ*, *Valeriana*, *Notochæte*, the purple *Convolvulus*, white-flowered *Polygona*, and *Cucurbitaceæ*, begin to flower. Acorns, holly, and laurel berries are fully formed; *Labiatæ* bud, so do *Compositæ* and *Urticeæ*.

In the garden there are still heartseases, lupines, sweet peas, roses, evening primroses, dahlias, sweet-williams, hollyhocks, mallows, snap-dragons, and marigolds. The kitchen-garden shows radishes, cress, cabbages, squash, and other Cucurbitaceæ; French beans and peas, but sparingly; cabbages, brocoli, and cauliflower abundant. Weeds grow apace and keep the gardener busy.

Second, or Middle Zone.—I spent much of this month at 12,000 to 16,000 feet elevation, and further north than in June. The rain-fall I found reduced to little more than 6 inches; it rained however nearly every day, three times as much falling at night as during the day. Between 10,000 and 14,000 feet vegetation has advanced during this month with marvellous rapidity. The short grass and herbage of open spots, especially at 10,000 to 12,000 feet, are replaced by a rank growth, 6 to 8 feet high, of *Thalictra*, tall *Astragalus*, grasses, and *Cyperaceæ*, *Euphorbiæ*, a superb yellow and a purple *Meconopsis*, each with racemes 1 to 2 feet long of blossoms as broad as the palm of the hand; gigantic *Heraclea* spring up 9 feet high whilst fruiting, with twiggy *Bupleura*, *Dipsacus*, *Convallariæ*, *Dispora* and *Smilacina*, *Cimicifuga*, *Rumex*, and various Compositæ not yet in flower, bound together by masses of *Cuscuta* and *Codonopsis*. Amongst these grow, but more sparingly, *Balanophora*, *Morina*, *Gerania*, large *Cynoglossa*, many *Pedicularis*, *Hypericum*, and *Gamoplexis*, together forming complete thickets of herbage. In more open places, at greater elevations, 11,000 to 13,000 feet, *Cypripedium*, *Epipactis*, and small *Orchideæ* are very abundant, with tufted *Astragali*, *Lloydia* (two species), other *Pediculares*, *Triglochin*, *Callitriche*, *Veronica*, *Campanula*, *Saxifraga*, *Draba*, small *Morina*, *Parnassia*, *Rheum*, *Thermopsis*, a *Saussurea* with bladdery bracts, *Anisodinus* flowers, Berberry begins to fruit, as do *Pyri* and *Lonicera*. Agriculture is little pursued at this elevation, *Fagopyrum* crops flower at 12,000 feet, and barley sown two months before is fully in ear, or, if sown in the end of May, in flower early this month. Radishes and turnips are in leaf at 15,000 to 16,000 feet, and their tubers formed. Potatoes flower.

Third, or Upper Zone.—There is much snow still in July, even on the rearward mountains, where the perpetual snow-line is at 18,000 feet; still most of the shrubs that are found above 14,000 feet are in flower, as *Spiræa*, *Lonicera*, *Potentilla*, willow, juniper, berberry, and an occasional rose. *Ranunculaceæ* abound, *Ranunculus*, *Delphinum*, *Aconitum*, *Caltha*, many *Astragali* flower, with *Corydalis*, *Hypecoum*, *Myosotis*, *Parnassia*; many *Pedicularis*, *Sibbaldia*; small *Primulæ*, *Alsineae*, and *Cruciferæ*; the alpine purple *Meconopsis*, *Morina*, *Androsaces*, *Picrorhiza*, *Nardostachys*, *Gymnandra*, *Dracocephalum*, *Veronica*, *Seda*, *Cassiope*, and *Menziesia*. The single-spiked *Carices* and *Poæ* flower, *Festuca*, *Aira*, *Hierochloe*, *Stipa*. In Tibetan regions a nettle abounds at upwards of 16,000 feet, and some *Artemisiæ* are the only early Compositæ in flower.

August.—Mean temperature (7,000 feet) 61·7°; of maxima 66·1°, and minima 57·4°; of daily range 8·7°. Extremes 70° and 54·5°; of radiation—solar 133°, terrestrial 50°. Extreme differences—solar 62°, terrestrial 3·5°. Mean dew-point 60·4°; saturation 0·97. Rain 29·454 inches (means of 4 years 33·320 and 24·510 inches). In 1849 26·811 inches fell, and it rained every day but one, 10·802 inches falling after sunrise, and 16 after sunset. In the interior, on the other hand, at the same elevation, I experienced only 12·45 inches of rain, of which 8·29 fell in the night, and 4·16, during day. It rained, however, more or less nearly every day.

Vegetation in the lower region is at its fullest vigour. The common bracken (*Pteris aquilina?*) covers the grounds, with a yellow *Cucurbitacea*. Many annuals that flowered in May and June are passing to seed, as *Cyrtandraceæ*, balsams, and begonias, but still many species are in flower. *Umbelliferæ*, which are rare below 9,000 feet, flower, together with *Anemone* *vitifolia*, various *Hedychia*, some very magnificent. *Sparganium* blossoms, and *Colquhounia*, the small-flowered *Neillia*, *Ceropegias*, *Cuscuta*, many *Cucurbitaceæ*, especially *Trichosanthes*, tree *Araliaceæ*, the sweet *Buddleia*, *Ophelia*, *Clematis*, *Tricyrtis*, *Passiflora*, *Myrsine*, and *Embelia*, yellow honeysuckle, *Xanthoxylon*, *Hypericum*, *Osbeckia* ; a few thistles commence flowering, with gnaphaloid *Compositæ*, but not so freely or fully as *Eupatorium*, blue *Cichoraceæ*, *Myriactis*, *Callimeris*, two *Artemisias*, *Picris*, *Inula*, *Doronicum*, and *Mulgedium*. In open places at 8,000 feet *Euphrasia*, *Drosera peltata*, *Neottia æstivalis*, *Dipsacus*, *Halenia*, and Erigerons flower.

In the kitchen-garden potatoes are planted with manure, and towards the end of the month the haulms of the early sorts wither, and the roots are stored. Table vegetables are abundant, with legumes of all kinds, turnips, radishes, carrots, lettuce, all varieties of vegetable marrows, squash, cucumbers, and asparagus, the latter generally small and woody. In the flower-garden are dahlias, marigolds, sunflowers, China roses, lupines, mignonette, larkspurs, rose-campions, œnotheras, heartsease, all thriving tolerably if protected from the rain, but it is better to keep them back till the following month.

There is little native cultivation carried on. Rice and other cerealia are in ear above 7,000 feet, and maize is in flower just below that.

Animal life swarms in this month, especially insects. Cicadas and glowworms ascend above 8,000 feet. *Libellulæ*, *Tipula*, *Cynthia cardui*, and *Papilio Machaon* are very frequent at 6,000 to 10,000 feet. Musquitoes in myriads and countless leeches, with sandflies, swarm at 6,000, and ascend to 8,000 feet, the leeches and sandflies, to 12,000. Swampy places become feverish even at 6,000 feet.

Second or Middle Region.—Above 9,000 feet vegetation is also in its prime, from the abundance of *Compositæ* which adorn the skirts of the woods and open places, especially beautiful senecios, thistles, *Mulgedium*, *Aplotaxis*, *Dolomiæa*, *Ligularia*, and *Saussurea*, *Callineris* and abundance of *Erigeron*, *Doronicum*, *Clematis* blossoms freely. Gentians, *Halenia*, *Ophelia*, &c., are all in bloom, with the most of the *Umbelliferæ*. Saxifrages form masses of golden blossoms at 12,000 to 13,000 feet, mixed with *Cyananthus*, *Codonopsis*, *Scrophulari*, *Polygona*, *Fumaria*, and *Corydalis*, *Oxyria*, *Primula denticulata*, *Salvia*, *Delphinia*, tall aconites, terrestrial *Orchideæ*, *Lilium Thomsoni*, *Verbascum*, and many other European genera.

Third or Arctic Zone.—Some beautiful primulas are still only in flower, near the snow, at 15,000 feet, with many species of *Corydalis*, *Nardostachys*, *Chrysosplenium*, *Menziesia*, *Seda*, *Saussurea*, *Parnassia*, yellow *Drabas*, and *Androsaceæ*, at the southern passes, which, being in a more rainy climate, are backwarder. In the northern or drier parts, again, *Artemisiæ* appear, with *Delphinium Brunonis*, various *Cyananthi*, *Veronisa*, *Kœnigia*, 6 potentillas, *Anaphalis*, *Serratula*, and many grasses, carices, and *Junci*.

September.—Mean temperature (7,000 feet) 60°; of maxima 64·7°, and minima 55·2°; of daily range 9·5°. Sunk thermometer 60°. Extremes of temperature 70° and 51·5°; of radiating thermometers—solar 142°, terrestrial 47·5°. Extreme differences—solar 70°, terrestrial 10°. Mean dew-point 58·5°; saturation 0·95°. Rain 15·762 inches (mean of four years 20·375 and 13·410). In 1849 15·675 inches fell, 3·621 by day, and 12·054 by night. It rained all the month except on 5 days, but most frequently at night. The first fortnight of this month is usually a continuation of the August humid weather, when it holds up for a week or so previous to the equinox, which is ushered in by violent electric disturbances and heavy gales.

The most prominent botanical feature of the month is the abundance of *Labiatæ*, especially *Plectranthi*, *Elsholsia*, *Craniotome*, *Colquhounia*, *Prunella*, *Ajuga*, *Scutellaria*, *Nepeta*, and *Melissa*; and graphaloid compositæ, especially species of *Anaphalis*, whiten the ground in some places. *Osbeckia* is in full bloom, with white and shrubby polygonums. Many *Urticeæ* flower, but they are insignificant green plants. March and April flowering species are generally in seed. *Acanthaceæ*, of which there are very few, flower.

In the garden the vegetables are, besides those of August, more *cruciferæ*, as kohl-rabi and savoys, with tomatoes and capsicums. Peas and beans are sowed for early crops, with cabbage, turnip, beet, radishes, and spring crops of all kinds. Peaches redden and fall off the trees without ripening. Strawberry-beds are cleaned and runners planted; rose-cuttings made. Rice and other cerealia are cut at 4,500 feet, but not higher.

Second or Middle Zone.—I passed the latter part of August and beginning of this month at 11,000 feet, considerably north of Kinchinjunga, in a very moist valley, with patches of snow in gulleys at 12,000 feet, where, however, the rain-fall was less than half that at Darjiling. From the 8th to the end of the month I camped at 15,400 feet, and experienced only 1·67 inches, whilst 9·993 fell at Darjiling. A good deal of this was in the form of snow, which lay for several days at 16,000 feet, as early as the 9th. At the equinox the snow lay three days around my tent, but melted again. In the more southern parts of Sikkim, the September snow-fall sometimes lies till the following April or May. The weather was constantly misty and foggy at my position, but was always clear, though cloudy, when I went into Tibet. This is a fruiting month everywhere above 13,000 feet; the barley and Fagopyrum crops are cut, and turnips and radishes gathered; the cattle are driven down to 12,000 feet early in the month, and to 10,000 feet towards the end. Dandelion, *Erigeron*, and other compositæ are still in full flower.

Third or Upper Zone, above 15,000 feet.—Many plants continue in flower early in the month and to beyond the middle, as beautiful *Cyananthi*, Gentians, ***Elsholsia***, ***Caltha***, ***Taraxanem***, ***Prunella***, curious *Lactuceæ*, *Saus-*

sureæ, and *Serratulas*, *Leontopodium*, and other Gnaphaloid compositæ. Small *Polygona*, *Primulæ*, and indeed all June and July flowering plants, ripen their seeds. By the 21st vegetation may be said to be at an end, the grasses change colour, and severe frosts set in. Birds migrate south, and the Hoopoe and various small birds are occasional visitants on their passage to warmer climates.

October.—Mean temperature (7,000 feet) 58°—of maxima 66·5°, minima 49·5°; daily range 17°; sunk thermometer 59°; extremes of temperature 68° and 43·5°; of radiating thermometers—solar 133°, terrestrial 32°; extreme differences from temperature of air—solar 65°, terrestrial 12°. Mean dew-point 52·5°; saturation 9·88. Rain-fall 8·66 inches (mean of four years 17·964 and 5·50). This is one of the most variable months in the year as regards the distribution of both heat and moisture. Fine weather almost invariably follows the equinoxial gales, and sometimes lasts. October has been described to me as a glorious, cloudless month, without a drop of rain. In 1848 there was more bad weather than good, with heavy squalls, thunder and lightning, and nearly 18 inches of rain fell. In 1849, again, very little rain indeed fell, but the month was so uniformly foggy and damp, that the rains were not considered over till November; yet during twenty days no rain fell at all. The same irregularity marks this season at all elevations, and I experienced more rain at 13,000 feet, in an almost Tibetan climate, than fell at Darjiling, owing probably to the condensation of the southerly wind over the September snow-fall, which had already lowered the snow-line in some parts of Sikkim.

In the lower zone there are still plants to flower, as *Prinsepia*, the beautiful blue *Crawfurdia*, *Eleagnus*, and *Balanophora polyandra*. Various species of *Clematis* also flower, with *Camellia*, *Eurya*, *Cuscuta*, *Symplocos*, *Prunus*, *Wightia*, a late-flowering *Michelia*, *Aplotaxis*, the superb *Luculia gratissima*, fragrant *Olea*, *Bucklandia*, *Eleanus*, and many parasitical *Orchideæ*. The apple and other wild fruits ripen.

In the garden the early frosts are apt to do injury; potatoes should be all housed; celery is planted out in trenches; cabbages and kohl-rabi in drills. The garden should be all cleaned and weeded for planting spring vegetables before the end of the month.

The natives gather in all crops between 6,000 and 8,000 feet this month, including the various millets, which yield 200 to 400 fold, and the unirrigated rice grown in slopes, and producing 80 fold on the average.

Second or Middle Zone.—Above 14,000 feet the scene is more wintry than autumnal, but below that many *Compositæ* and *Umbelliferæ* continue in flower, and some in fruit; the *Coniferæ* all have fully formed cones; some *Clematis* flower with *Prinsepia*, and blue *Crawfurdia* and the nut. The larch leaves turn yellow and then red previous to dropping. Belts of scarlet girdle the forests from the abundance of berberries, whose leaves change colour. The birch turns golden yellow, *Pyri* and maples red and yellow, whilst the *Abies Webbiana* and junipers are still black, the grass brown, rhododendrons a bright verdegris green. Of the latter some species throw out a few flowers, but most are in seed, as are wild currants, berberries, apples, hips, and Stauntonia, which latter affords the best wild fruit of this region and that below it, except *Rubi*.

November.—Mean temperature (7,000 feet) 50°—of maxima 56·5°, minima 43·5°: daily range 13°. Sunk thermometer 54°. Extremes of temperature 63° and 38°; of radiating thermometers,—solar 123°, terrest. 30°: extreme difference from temperature of air—solar 68°, terrest. 12°. Mean dew-point 46·5°; saturation 0·89°. Rain-fall 0·4. This is the least rainy month of the year, sometimes no rain falls, and it seldom exceeds a few tenths of an inch. Drought is sometimes experienced, with a bright clear sun by day and sharp frost at night. The sun's rays are very powerful, considering how low the temperature is, but the air is bracing and pleasant, like an English April.

The *Bucklandia* flowers in this month at 6,000 to 7,000 feet, a magnificent tree as regards form and foliage; *Wightia*, a scandent Bignoniaceous tree, also blossoms profusely, bearing no leaves, and forming immense masses of red in the forest; *Pittosporum* blooms, and a *Prunus* like *Padus*, whose leaves are excellent fodder for cattle. Alder is in catkin, and the yellow *Daphne Gardneri*, a very beautiful plant, scents the air; nettles flower profusely, and *Cuscuta*, with the great shrubby *Teucrium*. All crops are now housed, and wheat and barley sown at 9,000 feet to be reaped in May.

In the upper regions the snow-line descends to 14,000 feet.

December—Mean temperature (7,000 feet) 45°; of maxima 51·6°, and minima 34·9°; daily range 16·7°; sunk thermometer 48°. Extremes of temperature 56° and 32·5°; of radiating thermometers—solar 108°, terrestrial 26°. Extreme differences from temperature of air—solar 77·2°, terrestrial 10°. Mean dew-point 30°; saturation 0·61°. Rain-fall 0·45. This month is sometimes very dry; it was usually so in 1837, when Dr. Chapman's register was kept; his reduced wet bulb observations are those from which I have worked the dew-points. Hoar frost is of almost nightly occurrence in December, but the cold is never extreme. About Christmas a storm is experienced, and a great quantity of snow falls in the upper regions, at as low elevations as 9,000 feet, where I have seen 3 feet: much of this melts, however, owing to the warmth of the soil.

January.—Mean temperature (7,000 feet) 40°; of maxima 47·2°, and minima 32·8°; daily range 14·4°; sunk thermometer 45°. Extremes of temperature 56° and 29°; of radiating thermometers—solar 119°, terrestrial 16°. Extreme differences from temperature of air—solar 72°, terrestrial 12·7°; mean dew-point 34·3°; saturation 0·84°. Rain-fall 1·718 inches; mean of three years 0·30 and 4·27. January is generally a stormy month, with bitterly cold, often violent, winds, hail, sleet, and sometimes snow at Darjiling, and as low as 6,000 feet, never lying beyond a few hours at the latter elevation, and it is rare for three inches to remain as many days at 7,000 feet. Much snow falls about the middle of the month in the upper regions, the ground being covered several feet deep at 13,000 feet, and the snow-line is lowered to about that elevation, and does not recede from that till April or May. I found the soil at this elevation frozen for 16 inches, but warm below that, and as high as 34·5° at less than 3 feet deep

February.—Mean temperature (7,000 feet) 42·1°; of maxima 50°, and minima 34·2°; daily range 15·8°; sunk thermometer 47°. Extremes of temperature 57° and 25·5°; of radiating thermometers - solar 124·0°, terrestrial 23°. Extreme differences from temperature of air—solar 78°, terrestrial 15·3°. Mean dew-point 36·7°; saturation 0·85°. Rain-fall 0·916; mean of three years 2·047.

This is also a stormy and cold month, with a good deal of thunder and lightning, hail, and sometimes snow. Turnips, carrots, beet, and cabbage are the chief garden vegetables; peas blossom freely in spite of the weather; tender plants are protected by matting; artichokes and rhubarb are manured; lupines, marigolds, and stocks are still in flower. Snow that falls at 11,000 and 12,000 feet remains till April: there are no plants of any consequence in flower above 6,000 feet.

I append a meteorological register of the separate months for convenience of reference, but at the same time must remind the reader that it does not pretend to strict accuracy. It is founded upon observations made at Darjiling by Dr. Chapman in the year 1837, for temperature and wet bulb only; the other data and some modifications of the above are supplied from a very careful collection of a multitude of observations of my own. The means of the month are taken by meaning the daily maxima and minima, which I think gives too high a result. Those for terrestrial and nocturnal radiation are accurate as far as they go, that is to say, they are absolute temperatures taken by myself, which may, I believe, be recorded in any year, but much higher are no doubt often to be obtained. The dew-points and saturations are generally calculated from the mean of two-day observations (10 A.M. and 4 P.M.) of the wet bulb thermometer, together with the minimum, or are taken from observations of Daniell's hygrometer. The dew-point and temperature are assumed to coincide only at the hour of minimum temperature; but as they do coincide for, on the average, 10 hours of every 24, this method obviously gives too low a dew-point. On the other hand, the wet bulb observations or hygrometer, were never taken at the hours of greatest dryness; and as I find the mean of the temperatures of 10 A.M., 4 P.M., and the minimum to coincide within a few tenths with the mean temperature of the whole year, I assume that the mean of the wet bulb observations of the same hours will give a sufficiently accurate approach to that of the 24 hours. The climate of Darjiling station has been, in some degree, altered by extensive clearances of forest, which render it more variable, more exposed to night frosts and strong sun, and to drought, the drying up of small streams being one direct consequence. My own observations were taken at Mr. Hodgson's house, elevated 7,450 feet, where the differences of climate due to local causes are sufficiently indicated to show that in no two spots could similar meteorological results be obtained. At my station, for instance, the uniformity of temperature and humidity is infinitely more remarkable than at Dr. Chapman's, possibly from my guarding more effectually against radiation, and from the greater forest about Mr. Hodgson's uhose. I have not, however, ventured to interfere with the temperature columns on this account. Such as they are, I believe they afford amply sufficient data for the horticulturist who is anxious to exert his skill and ingenuity in the cultivation of Himalayan plants in general, and especially of Sikkim ones, though they little avail him except he be previously master of the climate of England, for which purpose I would most strongly urge the study of Mr. Daniell's Essay before alluded to, and the many papers in this Journal and elsewhere of Mr. Thompson, of the Horticultural Society's Gardens, which contain a vast amount of valuable matter, carefully collected and extremely well arranged.

	Mean Shade.	Max. Shade.	Max. Sun.	Greatest Diff.	Mean Max. Shade.	Minim. Shade.	Minim. Rad.	Greatest Diff.	Mean Minim. Shade.	Mean Daily Range of Temp.	Sunk Therm.	Mean Dew Point.	Mean Dryness.	Force of Vapour.	Mean Saturation.	Rain in inches.
January .	40 0	56·0	119·0	72·0	47·2	29.0	16·0	12 7	32·8	14·4	46·0	34·3	5·1	216	·84	1 72
February	42·1	57·0	124 0	78·0	50·0	25·5	23·0	15·3	34·2	15 8	48·0	37 2	3·9	·259	·87	0·92
March ...	50 7	66·5	120·0	60 0	58 4	37·0	27·8	8·7	43·1	15·3	50·0	45 8	5·8	·323	·82	1 12
April ...	55 9	68·5	125·0	66 0	63·7	38·0	33·0	16.0	48 1	15·6	58·0	49 8	6·6	·371	·80	2·52
May	57 6	69·0	125·0	65 0	65 3	38·0	40·0	10·0	50·0	15·3	61·0	54 4	2·7	·434	·91	9·25
June ...	61 2	71 0	126·2	62·2	66·7	51·5	47·0	4·8	55·8	10·9	62·0	59·5	2·0	·515	·93	26·96
July	61 4	69·5	130·0	62.0	65 5	56·0	52·0	3·5	57·3	8 2	62·2	60 7	0 8	·535	·97	25 34
August .	61·7	70 0	133·0	62·0	66·1	54·5	50·0	3·5	57·4	8·7	62·0	60 4	1·1	·530	·96	29'45
September	59 9	70·0	142 0	70·0	64 7	51 5	47·5	10·0	55·2	9·5	61·0	58 5	1·4	·498	·95	15·76
October...	58.0	68·0	133·0	65·0	66·5	43·5	32·0	12 0	49 5	17·0	60·0	52 5	4·2	·407	·86	8·66
November	50.0	63·0	123·0	68·0	56 5	38 0	30·0	12 0	43·5	13 0	55·0	46·5	3·2	·331	·90	0·11
December	43 0	56·0	108 0	77·2	51·6	32·5	26.0	10·0	34 9	16·7	43·0	31·8	10 6	·198	·69	0·45
Mean ...	53.5	65·4	125·7	67·3	60 2	41 3	35·4	9 9	46·8	13·4	56·2	49 3	3·9	·383	·88	122·26
London .	49 9	.	.	.	58·5	.	.	.	41·3	17·2	.	44·3	5 6	·342	83	24·2
Extreme Sikkim	.	71·0	142 0	78·0	66·7	25·5	16·0	15 3	32 8	17·0	.	.	10 6	535	·97	29·45
Extreme London	.	94·4	130·0	39 0	74·0	-4.5	-12·0	13 0	31·9	22·4	.	.	8·5	·482	93	2·97

Extract from the list of Premia offered by the SOCIETY OF ARTS, LONDON, *for* 1852-53.

For the importation of not less than half a ton of well-dried Plantains, or Bananas from the West Indies.—(The Great Exhibition brought to light samples of these fruits which had been in the Government stores for many years, but which are not yet imported for sale.)

For the importation from any British Possession, of not less than one hundred pounds of Dried Fruits, of equal quality with those now imported from the Mediterranean.

For the importation of any New Substances which can be successfully used as a substitute for Caoutchouc.

For the importation from China, India, or elsewhere, of any new Plants, or Trees producing Oils, or fatty Substances, which can be used as food, or are applicable to manufacturing purposes.

For the production of Oil and other substances from the Cotton-seed, and the application of the refuse material to agricultural or manufacturing purposes.—(This seed is at present a refuse material, but produces a good oil if crushed.)

For the most successful Cultivation of Flax, in British India, or Australasia.

For an Essay on the Flax Plants of India; the purposes to which they are at present applied, and the best means of employing the refuse material.

For the importation of at least two tons of any Vegetable Fibre, applicable to all the purposes for which Hemp is now used, and equally cheap, strong, and durable.

For the best sample of any new Ornamental Wood, suitable for the manufacture of Furniture.—(Many woods were exhibited at Hyde Park.)

For the importation from the East Indies, of Silk equal in quality to the best Italian or China Silk.

For the most economic method of Ginning Cotton, so as to obtain the longest and cleanest fibre.—(An old, but also a present, want.)

For an account of recent Improvements in the Machinery and processes employed in the manufacture and preparation of Sugar from the Sugar-cane, and its comparison with Beet-root Sugar.

Notice.

The Society in all cases expressly reserves the power of rewarding each communication in proportion to its merits, or even of withholding the premium altogether. In every case, however, Candidates may be assured that their claims will be judged with the utmost liberality.

All communications must be written on foolscap paper, on one side only, with an inch and a quarter margin. They should be accompanied by such drawings, models, or specimens as may be necessary to illustrate the subject. The drawings should be on a sufficiently large scale, to be seen from a distance when suspended on the walls of the meeting-room.

In regard to Colonial Produce of all kinds, it is absolutely necessary that a certificate from the Governor, or other qualified person, should accompany the samples sent to the Society, certifying that they really are the produce of the particular district referred to. The samples should be sufficient in quantity to enable experiments to be made, and an opinion to be formed of their quality. Cotton should be sent both in seed and picked. Flax should be accompanied by a description of the culture, the nature of the soil, the weight of the produce per acre, and the extent to which it is cultivated in the particular district. Silk, by a description of the method by which the silk-worms were managed; of the kind of trees, or plants, on which they were fed, and particulars respecting the culture of such trees and plants. Wine, by an accurate description of the vineyards from whence produced. In every instance the maximum extent of the plantation from which the produce has been taken must be stated; with the average yield obtained, and whether similar articles have hitherto been exported from the Colony, or not, and in what quantities.

All communications and articles intended for competition must be delivered to the Secretary, at the Society's house, free of expense, on or before the 31st of March, 1853. This restriction, as to the date of receipt, does not apply to articles of Colonial produce. Any communication, or paper read at an Ordinary Meeting, will be considered as the property of the Society, unless any previous arrangement has been made to the contrary. But should the Council delay its publication beyond twelve months after the date of reading, the Author will be permitted to take a copy of the same, and to publish it in any way he thinks fit.

Successful candidates will be communicated with on, or before, the 8th of June, 1853. Unrewarded communications and articles must be applied for at the close of the Session, between the 8th of June and the 9th of July, 1853, after which date the Society will no longer be responsible for their return.

EDWARD SOLLY,
Secretary.

SOCIETY OF ARTS, JOHN-STREET, ADELPHI.
LONDON, Nov. 1st, 1852.

[We have thought it desirable to reprint such of the above Premia as apply more particularly to the productions of India.—EDS. *Journal A. and H. Society of India*.]

The Composition of Rice-meal or Rice-dust. *By* DR. AUGUSTUS VOELCKER.

Rice-meal, rice-dust, or rice-refuse, which is obtained in cleaning rice for our market, consists of the husk and external layers of rice, together with fragments of the grain itself, and some accidental foreign impurities. This refuse has been used by several practical feeders with advantage in the feeding of stock. Whenever it can, therefore, be obtained at a moderate price, rice-dust will be found a valuable article of food, provided it is given to cattle judiciously along with other more substantial food. We fear, however, that this refuse is sold often much above its real value, and it appeared to us necessary, for this reason, to determine its value by analysis. From the manner in which rice-dust is obtained, we cannot expect it to be of uniform composition, but the following analyses may be taken as representing the composition of a fair average sample of unadulterated rice-dust. The sample analysed was offered for sale at £3 12*s* 6*d* in London, or, with expenses for carriage to Cirencester, would have cost £4 5*s* 6*d* per ton.

a. Per-centage of water.—Dried in the water-bath, it lost 12·019 per cent of water, or about the same quantity which common flour loses on drying.

b. Per-centage of ash.—Burnt in a platinum capsule, a whitish ash was left behind, amounting to 13·49 per cent of the whole weight of the meal in its natural state. The greater portion of the ash, namely 9·83 per cent, consisted of insoluble matters, chiefly carbonate of lime and silicic acid, with some phosphates; the smaller portion, namely, 3·66 per cent, was soluble in water, and consisted of soluble salts, chiefly alkaline chlorides.

c. Per-centage of protein compounds.—The proportion of flesh-forming substances in rice-dust was calculated from the per-centage of nitrogen, obtained by burning the substance with soda-lime, according to Wills and Varrentrapp's methods. In two combustions, precisely the same quantity (6·687 per cent) of protein compounds was found.

d. The oil in rice-dust was determined by digesting the substance repeatedly with ether, in which the oil is readily soluble. On evaporation of the several ethereal extracts, a yellow sweet oil remained behind, which amounted to 5·610 in the natural substance.

e. Woody fibre, starch, and *sugar* were determined in the usual manner.

The following numbers represent the composition of this sample of rice-meal or rice-dust :—

Water, ...	12·019
Woody fibre, containing insoluble inorganic matters, 9·83, ..	46·500
Starch, gum, and sugar, ...	25·524
Protein compounds, or flesh-forming constituents, ...	6·687
Fatty matters, ...	5·610
Soluble saline substances, ...	3·660
	100·000

These analytical results suggest to us the following observations :—

1. That this refuse is very rich in oily or fatty matters. It contains, indeed, as much fatty substance as the best oats, but is inferior in this respect to Indian corn, which contains rather more oil. Rice-dust, for this reason, is well adapted for the laying on of fat upon animals.

2. In rice itself, according to Payen, only 0·8 per cent of fatty matters occur ; and we find thus, that, as in most other kinds of grain, the fat is chiefly deposited in the exterior part of the seed.

3. Harsford found in the grain of rice 6·27 per cent of protein compounds in its ordinary, 7·4 per cent in its dry, state. In rice-dust I have found nearly the same quantity, namely, 6·687 per cent, in its natural state. As far as the power of producing muscle is concerned, rice-meal or dust appears to be fully as valuable as the grain of rice itself.

4. Rice-dust contains nearly half its weight of woody fibre, which possesses little or no value as a feeding substance. The exact quantity amounted to 46·500, which, added to 12·019 of water, gives 58·519 per cent of useless matter.

It has already been mentioned that the price of this refuse per ton, delivered at Cirencester, was £4 5*s*. The practical question, which chiefly interests the farmer, is, will it pay to buy rice-dust at this price, in preference to barley, oats, Indian corn, or any other kind of corn ? We should say decidedly that it would not pay at this price. Crushed oats of good quality, which can be had at about £6 60*s* to £7 per ton, contain the same quantity of fatty matters as rice-dust, but at least double the quantity of flesh-forming constituents and also once as much starch, gum, and sugar, as rice-dust. Oats appear, therefore, at least twice as valuable as this refuse ; and the price of the latter should, for this reason, not be more than about £3 to £3 5*s*.

Barley-meal is not quite so nutritious as oat-meal, but, taking into consideration that barley-meal does not contain so much husk as oats, and comparing its composition with that of rice-dust, we think that barley-meal may be considered as possessing once as much value, as a feeding substance, as rice-dust, without committing any great practical error. Barley-meal, however, can be had at £7 per ton.

(From the Journal of Agriculture and Transactions of the Highland and Agricultural Society of Scotland ; No. 39, N. S.)

CEDARS AND DEODARS.

[*From the* GARDENERS' CHRONICLE *for February* 12*th*, 1853.]

When the Deodar was first raised from seed in this country, the graceful weeping habit of its branches, their glaucous hue and long tender shoots presented an aspect so different from the ordinary appearance of seedling Cedars, that no one, we believe, who observed the two trees growing together doubted their distinctness. Systematic botanists have, however, all along, found a difficulty in pointing out tangible characters to distinguish them ; and travellers who had seen the trees in their native places of growth have, from time to time, reported that they are both liable to a very great amount of variation, and that both vary in the same way. If to this we add that, among the myriads of Deodars which are now yearly raised in this country, many varieties are already beginning to appear, some of which are much nearer the Cedar than the original state, it will not appear surprising that an opinion should have arisen among botanists, which begins to gain ground even among cultivators, that the two trees are not specifically distinct.

It is in all cases a matter of considerable difficulty to decide whether or not two closely allied forms are identical or distinct. Accurate observation of the plants in their native places of growth, during all stages of their existence, is the only unerring guide in such a case, and where that is impossible, a careful examination and comparison of extensive suites of specimens in all states can alone enable a botanist to decide on the identity or distinctness of two such forms. The difficulty of solving such a question, always great, is considerably enhanced when large trees form the subject of comparison, and is perhaps greatest of all with cultivated trees which, being placed in circumstances different from those in which they naturally grow, have a tendency to assume appearances different from those which are characteristic of the species. The question, indeed, is one in which the cultivator is as much or more concerned than the mere botanist, and it is one which the observant and philosophic cultivator is peculiarly qualified to answer, as from his acquaintance with the extent to which plants raised from seed are liable to vary, he is better than any other person able to decide what amount of variation may exist without specific difference.

That the Cedar and Deodar are very closely allied to one another no one doubts. Both belong to the same section of the Pine tribe, characterised by solitary persistent leaves, and erect cones. The male flowers in both are absolutely the same, and small branchlets of the two are, in the herbarium, almost undistinguishable—the mode of branching, insertion of leaves, and colour of bark being quite the same. The cones in both vary a good deal in shape, but the scales and broad-wedged seeds are the same in both species. A difference in the shape of the scales, indicated by ENDLICHER, seems to have no real existence, or rather to depend on the age of the cone ; for before maturity the scales are closely pressed together and bent upwards, but as the seed ripens they spread out and become straight or even reflexed before they fall away from the persistent axis.

The only points of distinction, then, which can be discovered between the Deodar and the Cedar of Lebanon are the generally greater length of the leaves of the latter, and a considerable difference of habit. This difference of general aspect will, we believe, be found to be the ground on which most observers rest their belief of the distinctness of the two trees. But though variations in this respect may be admitted as a *primá facie* indication that specific differences exist, yet they are in themselves no proof of such difference; and if a minute comparison of two supposed species fails to show any peculiarities of structure, mere size of parts and mode of growth cannot of themselves make two plants distinct. We all know how variable our forest trees are in these points; coniferous trees, indeed, to a greater extent than most others; and it would be within every one's experience that the Deodar is one of the most variable of a variable tribe. This may be well seen in any extensive plantation of Deodars, and any one may satisfy himself that it is the case by a visit to the fine avenue of these trees in Kew Gardens, in which may be seen many trees which are quite intermediate between the original state of the Deodar and the common Cedar, and one or two which, both in mode of growth and in rigidity and size of leaves, are almost identical with the Cedar of Lebanon. As permanency is the only test that can be applied to estimate the value of distinguishing characters, the occurrence of these intermediates forms the strongest argument against the distinctness of the two species; and if future observations should show a still further approximation of characters, what is now only probable, will become a matter of certainty. It is, however, a very curious fact that the Cedar is in this country much less liable to vary than the Deodar; and it has been suggested to us by a practical gardener of great experience, that the explanation of this may be found in the fact that all our Cedars descend from one common stock, or, at least, are derived from the same district in Lebanon, while the seeds of the Deodar are collected from widely distant parts of the great Himalayan chain.

Indian travellers unanimously testify that the Deodar is one of the most variable trees in its native country. Though probably confined entirely to the western and drier Himalaya, not being known to occur in a wild state in any part of the chain east of the Ganges, it has a wide range in altitude, growing equally in warm and sheltered valleys as low as 5,000 feet, and on exposed slopes, at a height of 12,000 feet, where, notwithstanding the elevation, the warm dry summer enables it to ripen its wood sufficiently to resist the intense cold of winter. In its native forests, we are assured that the Deodar is a tall conical tree, rising to a height of 100 or 150 feet, and sending out horizontal branches in all directions; or at times dividing close to the base into two or three trunks, which ascend parallel to one another to a great height. It is, however, also common in a state of cultivation, being generally planted near temples in the province of Kumaon, in which it is nowhere indigenous. There, probably, from its isolated mode of growth, as the same thing is observed wherever trees grow in exposed situations, it has quite a different shape. Low and flat-topped it rises to no great height, but sends out long straight branches, which bend downwards and often sweep the ground. The Cedar of Lebanon is also well-known to us from the accounts of travellers, who have observed it in its native forests, and from their descriptions we learn that it is there often a very different tree from that familiar to us in this country, being tall and straight, with horizontal branches, forming a beautiful cone.

The peculiar glaucous hue so characteristic of the earliest imported Deodars is not only not constant in the species, being absent in many of the varieties which have already arisen in this country, and unquestionably not present in adult trees in a wild state, but it occurs in some states of the Cedar. It cannot, therefore, though it forms the most striking distinguishing mark by which the Deodar is ordinarily recognised, be regarded as anything more than a very striking instance of the amount of variation to which species are subject, unless we assume what no one, we think, would be inclined to do, that the true Cedar, as well as the Deodar, is a native of the mountains of northern India.

We have purposely abstained from taking into consideration the geographical distribution of the two trees, as any argument founded on it would be inconclusive. It may, however, be noticed as corroborative of the view which we have been led to adopt, that the Deodar in India is exclusively confined to the western part of the Himalayan chain, and is especially abundant in the mountains of Kashmir, and that it extends thence into the mountains of Affghanistan. The hilly districts of eastern Persia are not, it would appear, sufficiently elevated for coniferous vegetation, nor is there at present any reason to suppose that any species of Cedar exists in northern Persia, where there are very lofty mountain chains. Still, our knowledge of that country and of Armenia and Caucasus, is too limited to warrant our asserting that the Cedar does not grow there, while in Taurus we know that the Cedar of Lebanon is indigenous.

It ought also to be borne in mind that among the trees which accompany the Deodar in northern India, there is a considerable number of European species. The Yew is plentiful in all parts of the Himalaya, and the common Juniper, though more Alpine, has nearly as wide a range. The tree Juniper of India, too, (J. excelsa,) extends into western Asia, so that at least three species of Conifers are common to that and the Himalaya. The Walnut, which is one of the commonest forest trees all along the chain of northern India, is also indigenous in the Caucasian provinces, and a species of Oak extends from Spain, through western Asia, Persia, and Affghanistan, into the drier parts of the western Himalaya. The common Berberry may be cited as another instance of the extension of European species in the far East, and the list of trees and shrubs might, if space permitted, be considerably increased, while the number of herbaceous plants which are common to Europe and the mountains of India is very great.—*T. T.*

[This very able statement of the botanical arguments that may be employed to show the identity of the Deodar and Cedar of Lebanon, *as species*, has been communicated to us by an experienced Indian friend, well acquainted with the former tree on its native mountains.]

Monthly Proceedings of the Society.

(Saturday, the 10th of July, 1852.)

W. G. Rose, Esq., Vice-President, in the chair.

The minutes of the last General Meeting having been read, the gentlemen who were proposed on that occasion were duly elected ordinary Members, viz:—The Hon'ble Barnes Peacock; Brigadier George Hampton; Surgeon T. W. Whitelock; Lieut. A. R. E. Hutchinson; Messrs. J. J. Ward, C. S.; H. H. Greathed, C. S.; H. Ricketts, C. S.; A. E. Brown; J. G. Ross; Dr. J. K. Walter; Baboo Joykissen Mookerjee and Major T. Martin.

Mr. W. T. Lewis was elected a Corresponding Member.

The names of the following gentlemen were submitted as candidates for election:—

The Hon'ble Capt. R. Byng,—proposed by Col. Garstin, seconded by Mr. George Taylor.

Dr. Andrew Wood, Superintending Surgeon,—proposed by Capt. F. C. Burnett, seconded by the Secretary.

H. H. Withers, Esq., Merchant, Calcutta,—proposed by Mr. George Dearman, seconded by Mr. James Church, Senior.

George Loch, Esq., Civil Service, Berhampore,—proposed by the Secretary, seconded by Mr. George Taylor.

Lieut. H. C. Johnstone, Assistant Executive Engineer, Sealkote,—proposed by Major R. Houghton, seconded by the Secretary.

Presentations.

1. Selections from the Records of the Bengal Government No. VII. Report on the Electric Telegraph between Calcutta and Kedgeree. By Dr. W. B. O'Shaughnessy. *Presented by the Government of Bengal.*

2. Journal of the Royal Asiatic Society of Great Britain and Ireland, Vol. XIII. Part 1, and Vol. XIV. part. 1. *Presented by the Society.*

3. The Journal of the Indian Archipelago for March and April 1852. *Presented by the Government of Bengal.*

4. A small quantity of seed of the thatching rush or reed of the Cape of Good Hope. *Presented by A. Sconce, Esq.*

Mr. Sconce mentions that this rush grows about four feet long; and it is put on the roofs of houses in bundles very much like our common Indian grass. "The thatch," Mr. Sconce adds, "is calculated to last 40 to 60 years, unrenewed, and would be, if introduced into India, of unspeakable advantage compared with the ordinary chopping grass. The rush grows on the sandy flats here, and on land where the rain lies longest. Doubtless there must be many districts in India where it would grow, and possibly the Society may think the seed worth being distributed."

The Secretary stated that a small portion of this seed (which had just been received), had been transferred to the Society's garden, and the residue could be distributed to such Members as were desirous of giving it a trial.

5. Fifty chocolate pods raised in the plantation of Mr. William Scott at Singapore. *Presented by Dr. K. M. Scott.*

A portion of these seeds have already germinated in the Society's garden.

6. Three bricks of mushroom spawn received in good condition from England per "*James Booth.*" *Presented by J. Cowell, Esq.*

7. Fifty sorts of seeds from China. *Presented by Arbuthnot Emerson, Esq.*

Several of these seeds have germinated freely.

8. A quantity of acclimated mignonette and cress seed. *Presented by George Hewett, Esq.*

9. A small supply of acclimated seed of Ipomæ rubra cerulea. *Presented by James Church, Esq. Senior.*

10. A quart of acclimated "canary seed" (*Phalaris canariensis*). *Presented by Messrs. A. B. Goodall and Co.*

11. A few roots of the grass (*Andropogon calamus aromaticus*) from which the "Roosa oil" is obtained. *Presented by A. J. Sturmer, Esq.*

12. A further assortment of fibrous specimens from nettles and other plants common to Upper Assam. *Presented by Major S. F. Hannay.* (Referred to the Hemp and Flax Committee.)

13. A muster of seeded cotton raised in his garden from imported Sea Island seed obtained from the Society in 1848. *Presented by H. Mornay, Esq.*

Mr. Mornay submits this specimen "more particularly to shew that, in this instance, the length of staple, blackness of the seed, and other peculiarities of this description of cotton, have not altered or degenerated. In other cases it has been reported to have degenerated in this country to the short-stapled, green-seeded kind."

Read the minutes of the Grain Committee on the paddy raised by Dr. Campbell, in the hills near Darjeeling, from the New Granada seed furnished last year to the Society for trial by Messrs. Gillanders, Arbuthnot and Co.

Resolved, that a copy of these minutes be forwarded to Dr. Campbell, together with the small specimens of the imported and acclimated paddy which have been prepared by Mr. Haworth, (a Member of the Committee,) in a state fit for the market.

Read the Gardener's Monthly Statement. Mr. McMurray reports the death of many of the seedlings raised from the English fruit and Cape indigenous seed, mainly in consequence of exposure to the weather since the destruction of the conservatory by the gale of the 14th and 15th of May. He adds that, with one exception, all the fruit trees which were shaken at the roots by that gale have recovered from the shock. Mr. McMurray intimates that the Coffee seedlings raised from Ceylon seed, presented by Mr. Thwaites in November last, continue in a healthy condition, and upwards of 15,000 plants are now ready for distribution to Members. The Sandoway tobacco seed, received from Captain Fytche, has germinated freely, as have also several other sorts of seeds which are referred to among the presentations. The Assam orchid plants from Mr. Simons, 111 in number, have reached by the last steamer in excellent condition.

The following notices were submitted to the Meeting :—

No 1. Proposed by Mr. E. Wingrove, seconded by Mr. H. Mornay :—"That in lieu of the present Journal, the Society publish a pamphlet after each monthly Meeting, containing its proceedings and such papers as may be brought forward at those Meetings, and that the Council be requested to report upon this proposition, as well as upon the propriety of embodying in the pamphlets extracts from English and foreign Journals on subjects which come within the objects of the Society."

No. 2. Proposed by Mr. Geo. Taylor, seconded by Mr. W. Haworth :—"That it be referred to the Council to consider the propriety of an application to Government in the shape of a memorial or otherwise with the view of obtaining some additional pecuniary assistance in furtherance of the objects of the Society."

Communications on various subjects.

1. From W. T. Lewis, Esq., dated Penang, 1st May, on the nature of the substance procured from China, under the name of "Rice paper," and the probability that it is afforded by the pith of *Scævola Taccada* Roxb. Mr. Lewis states that this plant is very abundant on all the sea coast of the Malayan Archipelago, and that the pith is commonly used by the Malays and Siamese in making their artificial flowers. Mr. Lewis submits specimens of the pith and pieces of the stalk of *Scævola Taccada*. He adds that the paper is mostly made in Chuan Choo, and the Chinese call the plant "Chow." It is known in Malay countries as the "Ambong Ambong."

2. From Dr. Falconer, submitting, at the request of the Council, some interesting observations on the above subject, in connection with Mr. Lewis's communication and specimens.

3. From Dr. Robert Wight, Superintendent Cotton Experiments, Coimbatore, dated 13th May, further remarks respecting the introduction and naturalization of the American cotton plant in India.

(The above three communications were referred to the Committee of Papers.)

4. From Capt. F. C. Burnett, dated Sealkote, 12th June, respecting gardening operations at that station.

5. From A. J. Sturmer, Esq., respecting the "tenni" paddy of the Azimghur district, of which specimens were submitted by him at the last General Meeting :—

" In regard to the 'tenni' or wild paddy that I sent you some time ago, I have obtained the following information It springs up when the rains set in June, and grows as the water increases in the jheels, or tals, as they are called ; in September it ripens, when those who use it collect the paddy. The rice is considered by the natives light food and very easy of digestion, hence is much sought for the sick and the weak. If the 'tenni' is sown in good paddy land, the grain grows thicker than that gathered from the 'tals' ; and if sown, and there transplanted, the grain thus produced is found to be still shorter and thicker than that sown broad cast.

" I shall make arrangements for the collection of a quantity of the 'tenni' for the Society at the close of the rains."

6. From Lieut.-Col. H. C. M. Cox, on the medicinal virtues of the gum of *Sterculea urens.*

7. From Dr. Wallich, on the subject of the consignment of flower seeds ordered from Mr. Carter, and promising to use his best endeavours to meet the wishes of the Society.

8. From Mr. C. J. Simons, dated Gowhatti, advising the despatch of a case of orchids for the Society's garden.

9. From Mr. D. Landreth, dated Philadelphia, 15th March, enclosing invoice of a consignment of vegetable, maize, and cotton seed, amounting to 1855 dollars, shipped per "*Loochoo*" from Boston.

(*Saturday, the* 14*th of August*, 1852.)

The Hon'ble Sir Lawrence Peel, President, in the chair.

The minutes of the last General Meeting were read and confirmed, and the gentlemen who were proposed on that occasion were duly elected Members, viz :—

The Hon'ble Capt. R. Byng ; Dr. Andrew Wood ; Messrs. H. H. Withers ; Geo. Loch, and Lieut. H. C. Johnstone.

The names of the following gentlemen were submitted as candidates for election :—

John Herriot, Esq., Merchant, Calcutta,—proposed by Baboo Ramgopal Ghose, seconded by Mr. W. Haworth.

James Lean, Esq., Civil Service, Moradabad,—proposed by the Secretary, seconded Mr. W. G. Rose.

Major E. Marriot, Pension Pay Master, Lucknow,—proposed by Lieut. John Eliot, seconded by the Secretary.

Capt. Henry Rigby, Executive Engineer, Midnapore,—proposed by Mr. A. Grote, seconded by Dr. Falconer.

J. P. Meik, Esq., Calcutta,—proposed by Mr. Rose, seconded by the Secretary.

Baboo Preonauth Sett,—proposed by Baboo Peary Chand Mittra, seconded by Mr. Rose.

Dr. D. Scott, of the Hurriana Lt. Infy. Battn.,—proposed by Capt. F. C. Burnett, seconded by the Secretary.

Presentations.

1. A small assortment of fresh Jamaica fruit seeds, containing, among other sorts, the "mamee sapota," the fruit of which is considered to be one of the best in the Island of Jamaica; "Star apple," "Guinea tamarind," and South American Neisberry: also a small packet of flower seeds from New South Wales and a pumpkin from Sydney. *Presented by W. Haworth, Esq. on behalf of E. M. Cowell, Esq.*

2. A small collecton of fruit trees indigenous to the Straits of Malacca, consisting of the mangosteen, rambutan, doorian, nutmeg, scented betelnut, &c. *Presented by Capt. Alston of the "Mor," on behalf of Mr. Whampoa of Singapore.*

3. An assortment of seeds of shrubs, trees, and annuals from the Kew Gardens. *Presented by Dr. Wallich, on behalf of Sir Wm. Hooker.*

In his letter advising the despatch of the above-mentioned seeds, Dr. Wallich states—"Sir William is able to supply the Society with a vast amount of seeds in quantity and number of sorts of the description required. More than that, he is perfectly able, as well as willing, to supply them annually on condition of reciprocity. This is the principle upon which alone the noble Institution under his direction can enter upon any arrangement of supplies."

The Secretary having announced that portions of the assortment had been transferred to the Society's Garden, and to the H. C. Botanic Garden, it was agreed that portions be also transmitted for trial in the public gardens at Bhaugulpore, Delhi, Simla, and Lahore, reserving certain kinds for Members residing in localities suitable for their growth.

4. Samples (1 and 2) of the rheea nettle grass of Assam, and a sample of the China nettle grass, for comparison. *Presented by Lieut.-Col. Jenkins, on behalf of Major Hannay.*

Major Hannay sends the above specimens for distribution among any of the Members of the Society who take an interest in the fibre. Major Hannay adds that he finds this nettle yields between 15 and 19 maunds of raw produce per Assam Poorah (1⅓ acre).

5. An assortment of fruit, vegetable, and flower seeds *Presented by Arbuthnot Emerson, Esq.*

An exceedingly well grown plant in full flower, of *Rondeletia odorata* from the Society's Garden, was shewn to the Members: also a plant in blossom of *Phaius maculatus*, from the garden of Mr. B. Warwick.

The proposal made at the last Meeting,—"That it be referred to the Council to consider the propriety of an application to Government with the view of obtaining some additional pecuniary assistance in furtherance of the objects of the Society," was brought forward with the opinion of the Council,--"That the present is not a favorable period for asking the proposed assistance from Government." Confirmed.

The Secretary stated that the other proposal, also made at the last Meeting, in reference to the issue of a monthly pamphlet in lieu of the present Journal, was still under the consideration of the Council.

The Gardener's Monthly Report was submitted respecting various contributions to the Garden during July, including certain observations regarding a supply of pods of *Theobroma cacao*, lately presented to the Society by Dr. K. M. Scott.

Read the following report from Captain A. Thompson on the fibre of the "red mesakee" of Assam, which was presented by Major Hannay at the last Meeting:—

"Agreeable to your request I forward you a log-line made of the red mesakee plant, as also the remainder of the fibre itself.

"I find the strength of it quite equal to Russian hemp, but for want of being properly harvested, the fibres cling so close together that great loss of material takes place in hackling it.

"I think it well adapted for cordage, and if brought into general use ought to bring as much as Petersburgh hemp."

Read the following extract of a letter from Major W. H. Nicholetts, dated Seetapore, Oude, 31st July:—

"I beg to state that the 'hearts's ease' produced from the seeds you last year sent were the finest I ever saw even in England, being much larger than a crown piece, and perfectly circular. The good soil of Seetapore may have had something to do with it, as the flowers and vegetables produced here, are some of the finest I have ever seen produced in India. The beet-root was superb, also peas and cabbages very fine.

"The double stocks magnificent—the dahlia seed did not germinate."

From Mr. James Carter, acknowledging receipt of the order for the Society's annual consignment of flower seeds, to be forwarded by the August steamer, and promising to give it his best attention.

(Saturday, the 11*th of September,* 1852.*)*

The Hon'ble Sir Lawrence Peel, President, in the chair.

The minutes of the last General Meeting having been read and confirmed, the gentlemen who were proposed on that occasion were duly elected Members, viz :—

Messrs. John Herriot ; James Lean, C. S. ; J. P. Meik ; Major E. Marriott; Captain Henry Rigby ; Baboo Preonauth Sett and Dr. D. Scott.

The names of the following gentlemen were submitted as candidates for election :—

Brigadier Penny, C. B., Jullundur,—proposed by Dr. Falconer, seconded by Mr. Grote.

R. B. Morgan, Esq., Civil Service, Delhi,—proposed by Mr. R. H. S. Campbell, seconded by the Secretary.

James Dickson, Esq., Merchant, Calcutta,—proposed by Mr. James Church, Senior, seconded by Mr. Haworth.

A. G. Macdonald, Esq., Civil Service, Malda,—proposed by Mr. James Grant, seconded by the Secretary.

George Octavius Wray, Esq., Calcutta,—proposed by Mr. M. F. Sandes, seconded by Mr. W. G. Rose.

Major Henry Spottiswoode, Commanding 21st N. I., Sealkote,—proposed by Captain F. C. Burnett, seconded by the Secretary.

F. A. Glover, Esq., Civil Service, Chumparun,—proposed by Mr. G. N. Wyatt, seconded by the Secretary.

Presentations.

The following contributions were announced :—

1. Journal of the Indian Archipelago for May and June 1852. *Presented by the Editor.*

2. Copies of the same work for the same period. *Presented by the Government of Bengal.*

3. Journal of the Asiatic Society of Bengal, No. 4 of 1852. *Presented by the Society.*

4. Proceedings of the Agricultural and Horticultural Society of the Punjaub, from January to June 1852. *Presented by the Society.*

5. A small supply of New Zealand seed-potatoes. *Presented by Captain Maclean of the " Agra."*

These have been planted out in the Society's garden, and the Gardener reports that they are doing well.

6. An assortment of acclimated flower seeds, consisting of 43 kinds, the produce of English seed received last year from the Society. *Presented by G. N. Wyatt, Esq., of Peeprah, Chumparun.*

7. A small quantity of Demerara Indigo Seed. *Presented by H. Piddington, Esq.*

8. Specimens of the pith commonly known as the "Rice paper" of China. Presented by Dr. Mouat, with an extract of a letter, to his address, from J. C. Bowring, Esq., dated Hong-Kong, 16th August, respecting the above specimens.

9. Sixteen plants of sorts, consisting of mangosteen, nutmeg, doorian, orchids, euphorbias, &c ; and a quantity of erica seeds of sorts from the Cape of Good Hope. *Presented by Arbuthnot Emerson, Esq.*

The following specimens were likewise brought to the notice of the Meeting :—

A plant, in very fine flower, of *Dendrobium Farmerii*, from the garden of James Church, Esq.

A fine healthy plant of *Nepenthes Rafflesiana*, with several pitchers, from the Society's Garden, being one of the collection of Malayan plants, presented by Mr Moxon, in January 1851.

Two plants, in full flower, of *Achimines longiflora*, and an orchid, with a small sweet-scented white flower, from the garden of B. Warwick, Esq.

A few very pretty cut specimens of dahlias, raised from Simla stock, from the garden of Mrs. Macleod.

A plant of *Crotalaria tenuifolia* raised in the Society's Garden from seed received from Mr. Williams, of the School of Industry at Jubbulpore. This plant, though grown in a pot, separately from the other seedlings (which have been raised in the open ground), has attained the height of 8½ feet in nine weeks, without branching. The Secretary submitted specimens of raw fibre from this species of *Crotalaria*, and of twine manufactured therefrom by Messrs. Harton and Co. who presented them to the Society at the General Meeting in May last. Both Messrs. Harton and Co., and A. Thompson and Co., have lately procured a quantity of this raw material, as "Jubbulpore hemp," from Mr. Williams. It is pronounced superior fibre for cordage purposes, of such excellent quality and strength, that those manufacturers have hitherto considered it to be the produce of *Cannabis sativa*, the plant from which Russian hemp is obtained.

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The Gardener's Monthly Report was submitted. Mr. McMurray announces that one of the batch of seeds of *Victoria regia*, received from Dr. Wallich in November last, has germinated, after lying in the water nearly ten months. He reports favorably of the quality of the American vegetable seeds received in August from the Society's seedsman, Mr. Landreth, of

Philadelphia: and gives, in details, several contributions for the garden since his last monthly statement was furnished:—viz., plants of *Bignonia incarnata* and *Araucaria Cunninghami* from the H. C. Botanic Garden; of *Tecoma radicans*, from Messrs. G. Bartlett and R. F. Ross; of *Passiflora Buonapartea* and *kermesina*, from Mr. James Church, Senior; and of *Cleredendron splendens*, from Mr. Dougherty of the Barrackpore Park. The Gardener also alludes to the Chinese bamboo plant (which was presented by Mr. Emerson in January last) as having made a healthy and vigorous growth since the commencement of the rainy season; it is very prettily striped—dark green and light yellow,—and the joints are short and firm.

Communications on various subjects.

The following papers were submitted:—

1. From Major J. A. Crommelin, a brief account of the experiments that have been made with a view to the introduction of the tea plant at Darjeeling. Ordered for publication.

2. From W. T. Lewis, Esq., dated Penang, 26th July, returning his best acknowledgments for his election as a Corresponding Member of the Society.

3. Erom Lieutenant-Colonel George Congreve, C. B., H. M. 29th Regiment, reporting the result of his trials with the bulbs received last year from the Society.

4. From Dr. Falconer, forwarding a table drawn up by Mr. Scott, Head Gardener, H. C. Botanic Garden, of a trial sowing of the American vegetable seeds, "which is," Dr. Falconer observes, "in every respect unusually favorable; out of 50 kinds only two failed. Mr. Scott remarks that the lowest per centage is 10 per cent. limited to a single instance,—the others ranging from 20 to 95 per cent. and upwards." The general average is 64 per cent.

5. From Mr. R. Dougherty, in charge of the Barrackpore Park, also reporting most favorably on the germination of the American vegetable seeds.

6. From Dr. Wallich, dated London, 19th July,—on the subject of obtaining plants from the Kew Gardens and giving in return; also, further suggestions respecting the procuring of seeds of flowering plants and shrubs. Referred to the Floricultural Committee.

7. From Dr. John Maitland, dated Lingsoogur viâ Muctul, 12th August, respecting his trials of English flower seeds received last year from the Society.

8. From Dr. Macgowan, dated Ningpo, 5th November 1841 (received at the end of August, owing to some mistake at the Hong-Kong post office) expressing his grateful sense of the honor conferred on him by his election as a Corresponding Member of the Society. In reply to an enquiry that had been made of him respecting the price at which the grass-cloth fibre is

obtainable, Dr. Macgowan writes as follows :—"I took immediate steps to ascertain the market price of the grass-cloth fibre at Canton and Shanghai, but until this afternoon I could procure no reliable information in consequence of the fact that the article is no longer exported to Europe, the price being found altogether too high for English manufacturers ; I cannot better illustrate this than by stating that a mercantile house, in London, sent an order to China for a quantity of the fibre, provided it could be purchased at six dollars per pecul, *i. e.*, 132 lbs ; the price of the article did not allow the agent to execute the commission, and soon afterwards he was informed by his English correspondent that even at that price it could not be sold in London. Unless, then, it can be produced in Assam at a price considerably lower than that which is here given, it would not find a market."

Dr. Macgowan likewise offers some suggestions, respecting the procuring of certain descriptions of seeds from various parts of China, in answer to enquiries preferred to him on that subject. These were referred to the Council for consideration.

9. From Dr. Falconer, enclosing a list of plants recently received, per *Tenasserim*, from Captain Tarleton, H. M. Ship *Fox*, from Rangoon, consisting of a few orchids, balsam, cockscomb, curcuma, pandanus and other common kinds, found on captured Burmese boats on the Irrawaddi. The following is an extract of Dr. Falconer's note on the subject : —"You are aware that an immense number of Burmese boats have been captured lately between Rangoon and Prome. Commander Tarleton of H. M. Ship *Fox*, who had such an active share in the naval operations on the Irrawaddi, found that in many of these boats the Burmese had small collections of living plants, placed near the stern. He has very obligingly sent us one of these collections taken from a rescued boat. The plants arrived by the *Tenasserim* last trip. They are neither rare, nor very remarkable ; but as it may be of interest at the present moment, to note the fact, I send you a list enclosed of the plants received. It is gratifying to observe that our naval officers, in the midst of their exciting work upon the Irrawaddi, are not forgetful of objects of more quiet interest."

10. From Dr. Wallich, dated London, 13th July, announcing that the testimonial voted to Mr. Hume is almost completed, and will be despatched by the August steamer.

11. From Captain F. C. Burnett, dated Sealkote, 5th August, acknowledging receipt of certain seeds received from the Society.

12. From Messrs. Villet and Son, Cape of Good Hope, advising despatch of the annual consignment of vegetable seeds to the order of the Society.

(Saturday, the 9th of October, 1852.)

The Hon'ble Sir Lawrence Peel, President, in the chair.

The minutes of the last General Meeting were read and confirmed.

The following gentlemen were elected members :—

Brigadier Penny, C. B.; Messrs. R. B. Morgan, C. S.; James Dickson; A. G. Macdonald, C. S.; G. O. Wray; F. A. Glover, C. S.; and Major H. Spottiswoode.

The names of the following gentlemen were submitted as desirous of joining the Society :—

Henry Christie, Esq., of Cawnpore,—proposed by Dr. Begg, seconded by Dr. Porteous.

Captain M. J. Turnbull (Army Clothing Agent),—proposed by Mr. C. A. Cantor, seconded by Dr. Falconer.

Captain Fletcher Hayes, Political Assistant Resident at Lucknow,—proposed by Sir James Colvile, seconded by Sir L. Peel.

H. Knowles, Esq., Calcutta,—proposed by Mr. W. Haworth, seconded by Mr. J. M. Hall.

T. E. Carter, Esq., Calcutta,—proposed by Mr. Haworth, seconded by the Secretary.

Presentations.

The following donations were announced :—

1. Synopsis of the vegetable products of Scotland, by Peter Lawson and Son. *Presented by the Authors.*

2. The 29th Annual Report of the Royal Asiatic Society of Great Britain and Ireland, 1852. *Presented by the Society.*

3. A brief account of the Silk Manufactures of Lahore, by Henry Cope, Secretary Agricultural and Horticultural Society of the Punjaub. *Presented by the Author.*

4. Statements of the Trade of the Madras Territories for 1849-50. *Presented by Baboo Peary Chand Mittra.*

5. An Alphabetical List of Bengalee Books that have been printed during the last fifty years. *Presented by the Compiler, the Rev. J. Long.*

6. A quantity of acclimated sweet-pea seed. *Presented by H. C. Tucker, Esq.*

7. A collection of orchids (100 plants). *Presented by R. W. G. Frith, Esq.*

8. A small assortment of tulip, narcissus, hyacinth and jonquill bulbs. *Presented by Geo. Taylor, Esq.*

9. A small collection of plants of sorts, consisting, among other kinds, of *Cyprepedium venustum, Achimines multiflora, and Phaius grandiflorus. Presented by J. Burton, Esq.*

10. Specimen of oil from "Sirgoojah," or "Ramtil," seed *(Verbesina sativa, Roxb.). Presented by Baboo Peary Chand Mittra.*

The following memorandum gives certain details respecting the above oil:—

"In Rajshaye the cost of cultivation, rent of land, reaping and cleaning charges amount to Rs. 1-8 per beegah. The produce of each beegah on an average is four maunds of 60 sicca weight. The quantity of seed required for making one maund of oil is 3½ maunds. A maund of seed sells generally for a rupee, and the charge of bringing it to Calcutta is about three annas. The oil is used by the poorer classes in rubbing their bodies, but not in food. The other purposes to which it is applied are the cleaning of machinery, lighting, and preparation of paint not exposed to the sun."

The Secretary drew attention to certain particulars respecting this oil and seed, as contained in the Journal of the Society, Vol. VII. and Vol. VIII. Part 1, from which it would appear that the oil is largely used for culinary purposes at Poona and other localities in the Bombay presidency ; and that the seed was valued by London Brokers, in March 1850, at 37 shillings per quarter.

A plant, in flower, of *Æschynanthus speciosus*, from the garden of Mr. B. Warwick, was placed on the table.

The Motion of which notice was given at the July Meeting was brought forward, viz.—" That in lieu of the present Journal, the Society publish a pamphlet after each monthly Meeting, containing its proceedings and such papers as may be brought forward at those Meetings, and that the Council be requested to report upon this proposition, as well as upon the propriety of embodying in the pamphlets extracts from English and Foreign Journals on subjects which come within the objects of the Society," with the following report of the Council :—" That the Journal be continued in its present form, but be published once a quarter, or more frequently, if sufficiently interesting matter can be found." Agreed to.

Read the Gardener's Monthly Report. Mr. McMurray submits a tabular statement of the result of his sowing of the American and Cape vegetable seeds received in August last, from which it would appear that the per-centage of the American seeds of this year's sowings is much more favorable than that of the last season ; whereas in the case of the Cape seeds it is less than that of last year. The general average per-centage of the American seeds this season is 68, and of the Cape 62. The Gardener states that the plantation of American Sumac or " Dividivi," (*Cæsalpinia coriaria,*) along the west border of the Garden, has made a most healthy growth during this year ; several of the trees are now in full bloom, and are likely to yield a large crop of seed for distribution during the ensuing season. The row of cocoanut trees on the northern boundary of the Garden have also made a vigorous growth during the present season, and some of them are now in flower for the first time ; those from Penang stock, presented by Mr. Joseph Agabeg, are also doing well. The plant of *Poinsettia albida*, presented by Sir L. Peel in January 1851, has stood well throughout the hot and rainy season, in an open border of the flower garden : it has now 16 branches varying from 2½ to 3 feet in height, from which the Gardener hopes to have a number of plants struck and ready for distributing to the Members during the approaching cold season. Mr. McMurray alludes to several contributions to the Garden during the past month, and adds that seven of the thirteen kinds of Jamaica fruit seeds, which were presented in August by Mr. E. M. Cowell, have germinated. He concludes his Report by stating that he has now ready for distribution at the fixed rates, 600 mango grafts of fourteen kinds; 200 peach grafts of 12 kinds, including Mr. Emerson's China Flat variety, and some of American stock ; besides a number of other kinds of fruit trees.

Communications on various subjects.

The following letters were also submitted :—

1. From Captain G. E. Hollings, Leia, on the Indus, dated 13th September, respecting his Agricultural and Horticultural operations.

2. From Dr. James Allan, Bhaugulpore, dated 7th September on the same subject.

3. From Dr. Falconer, respecting the *Crotalaria* yielding the Nerbudda fibre, known as "Jubbulpore hemp ;" a plant of which, from a number raised in the Society's Garden from seed received from Mr. Williams at Jubbulpore, was exhibited at the last monthly Meeting. Dr. Falconer observes that though the specimen submitted for examination was not in flower, he has little or no doubt of its being *C. tenuifolia* of Roxb. which Wight and Arnott, and some other Botanists, regard as merely a variety of *C. juncea,*—the plant yielding the well-known "Sunn hemp" of commerce.

4. From J. C. Wilson, Esq., dated Moradabad, 17th September, on the Turace as a good locality for foreign descriptions of cotton.

5. From Dr. Wallich, announcing the despatch, per Screw Steamer *Lady Jocelyn*, of the Testimonial voted to Mr. Hume. After giving a few details respecting the emblematic figures on the service and the workmanship, which has been much admired by several friends, (Mr. Brown, Sir. W. Hooker and others,) Dr. Wallich observes :—"I therefore hope, that it will be judged by the Society, as worthy of the occasion for which they ordered it, and a not altogether unsatisfactory evidence of my hearty wish and anxiety to be of service and to prove my sincere attachment to the Society. I think it but due to Messrs. Lambert and Rawlings to declare that nothing can exceed the courtesy and readiness with which they executed the novel and not a little difficult designs. The reduction in point of natural size of the flowers and fruits, &c. was an arduous matter, and must be made due allowance for. The following then is a list of the emblematic figures, namely, *Careya herbacea*, and *Leycesteria formosa*, representing the great founder and the first President of the Society: *Roxburghia viridiflora* and *Dischidia Rafflesiana*,

names that must ever be mentioned with the highest respect by Agriculturists and *Horticulturists ; tea, coffee and cotton in flower and fruit ; the pitcher* plant, cocoanut, melon ; *Cardiospermum Halicacabum* (a fancy of the artist) very common all over India."

The following recommendation of the Council in reference to the above was adopted, viz :—" That the Testimonial be exhibited at the Metcalfe Hall for a short period to subscribers, and to the public generally, due notice of the same being given by advertisement."

6. From Mr. James Carter, Seedsman and Florist, dated London, 24th August, advising the despatch, per overland conveyance, of the Society's consignment of English flower seeds.

7. From Messrs. Peter Lawson and Son, of Edinburgh, dated 21st August, stating that they have forwarded per steamer, the assortment of vegetable seeds ordered by the Society.

These flower and vegetable seeds were received by the last mail, and are now in course of distribution to Members.

An estimate was submitted by the House Committee from Messrs. Burn and Co., for giving a thorough repair to the Metcalfe Hall premises, amounting to Rs. 2,500. *Resolved*, on the recommendation of the Council, that the estimate be accepted, the curators of the Public Library, having agreed, on behalf of the Library, to pay their moiety of the above sum.

(*Saturday, the* 19*th of November*, 1852.)

W. G. Rose, Esq. Vice-President, in the chair.

The minutes of the last General Meeting were read and confirmed.

The following gentlemen were elected Members :—

Capt. M. J. Turnbull, Capt. Fletcher Hayes, Messrs. Henry Christie, H. Knowles, and T. E. Carter.

The names of the following gentlemen were submitted as desirous of joining the Society :—

Lieut. H. G. Jenkins, 10th Light Cavalry, Kurturpore,—proposed by Capt. T. C. Blagrave, seconded by the Secretary.

Meer Abdool Muzzeed, Zemindar, Calcutta,—proposed by Baboo Debendernauth Tagore, seconded by Baboo Peary Chand Mittra.

The Rev. W. Lipp, Kishnaghur,—proposed by Mr. R. S. Palmer, seconded by Mr. J. Church, Senior.

Capt. T. P. Sparkes, Assistant Commissioner of Arracan,—proposed by Mr. E. Blyth, seconded by the Secretary.

John Watson, Esq., Merchant, Calcutta,—proposed by Mr. E. E. Wingrove, seconded by Mr. W. G. Rose.

Baboo Shib Chunder Mullick,—proposed by Baboo Peary Chand Mittra, seconded by Baboo Shib Chunder Deb.

Presentations.

The following donations were announced :—

1. A small collection of rattan and fibrous yielding plants from Arracan. *Presented by Lieut. F. W. Ripley, Junior Assistant Commissioner of Arracan.*

2. A further collection of orchids from Assam, including *Vanda cærulea* and *Cœlogyness* of sorts ; also a few *Nepenthes. Presented by Mr. C. J. Simons.*

3. Fresh seeds of the Hymalayan Box, collected in Kooloo, at an elevation of 5,600 feet. *Presented by the Agricultural and Horticultural Society of the Punjaub.*

4. An assortment of vegetable and flower seeds from Messrs. Bridgwater, Payne and Co., of Southampton. *Presented by E. E. Wingrove, Esq.*

The Secretary stated that these seeds had been transferred to the Society's Gardener for trial.

5. Acclimated seed of sweet pea, lupin, stock, and mignonette. *Presented by A. Imlach, Esq.*

6. Specimens, in a dried state, of the juice of the mŭddăr, (*Asclepias gigantea.*) *Presented by Captain Meadows Taylor.*

7. Muster of cotton raised from seed received from Malta. *Presented by H. Piddington, Esq.*

The following is extract of Mr. Piddington's note on the above cotton :—

" I some time ago sent to the Society, with other seeds from Malta, some which I had received with that dispatch as 'Maltese *brown* cotton' seed.

" Having, however, sown some in my compound, I find that it is something yet more important ; being not only a very beautiful *white* cotton of fine staple and easily separating from the seed, but an abundant bearer, and moreover, a cotton which sown in July (I think) will grow vigorously through the drenching rains we have had in August and September, and flower and pod in October, so as to be picked in November and thus escape the cold weather insects, &c. The soil of my compound is very poor, and except in the admixture of calcareous matter which all town soils have,* I do not think it superior to a good average Bengal upland soil. It remains to be seen what this cotton will become as a field plant, but I think it will certainly be found to be worth attention."

8. Further specimens of the *room* dye of Assam, obtained from a species of *Ruellia. Presented by Major Hamilton Vetch.*

No. 1. Obtained by exactly the same process as in making indigo, and No. 2, obtained by the native process without boiling.

The Secretary intimated that Mr. Dodd (of Messrs. Thomas, Marten and Co.), to whom these specimens had been referred, reports that he considers them worthless. A small portion was steeped for three days in sulphuric acid, but no colouring matter could be obtained from it.

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* And which I think essential to the production of good crops of some kinds of cotton.

9. Muster of sheep's wool from the Thul or Bar (desert tracts) of the Jhung district, in the Punjaub. *Forwarded by the Agricultural and Horticultural Society of the Punjaub, for an opinion on its quality and value in the English market.*

Resolved, that Mr. Haworth's opinion be, in the first instance, solicited on this wool, and that Mr. Cantor's kind offer of forwarding it afterwards to England be also accepted. Further, that the Punjaub Society be requested to furnish such particulars as they may possess respecting the article.

10. A large block of the wood of the banian tree (*Ficus Indica*) finely polished. *Presented by C. E. Blechynden, Esq.*

A fine healthy plant of *Cyprepedium insigne* in full flower, from the garden of Mr. B. Warwick, was also placed on the table.

The Gardener's Monthly Report was submitted, as also a statement of the germination of the vegetable seeds, from Messrs. Lawson and Son, of Edinburgh, and of the flower seeds from Mr. Carter of London. The vegetable seed table gives an average per-centage of 57, and of the flower seeds 65, out of the 82 kinds received, have germinated freely. Seventy kinds of the batch of seeds from the Kew Garden have germinated, and more are shewing signs of coming up daily. Of the 59 kinds of tree and shrub seeds of North America received from Mr. Landreth, only 16 sorts have as yet germinated. The Gardener reports the loss of 58 fruit trees of sorts, peaches, mangoes, pumplenose and others, in consequence of the heavy rain of last season, although every means were used by opening drains, &c., to carry off the surface water. The peach plot has suffered most, shewing a loss of 30 out of the 58 trees above mentioned. Mr. McMurray gives a list of contributions to the Garden, including the plants from Lieutenant Ripley and Mr. Simons; and announces, in conclusion, that several of the plants of *Nymphæa cerulea*, raised from the seed purchased by the Society last year from the Cape of Good Hope, are flowering freely.

The following letters were also read :—

1. From Capt. Meadows Taylor, on the juice of the Mŭddār, as a substitute for Gutta percha, and detailing certain experiments made on it.

2. From H. Cope, Esq., Secretary Agricultural and Horticultural Society of the Punjaub, applying for a copy of part 3 of Dr. Griffith's *Icones Plantarum Asiaticarum*, and *Notulæ Plautas Asiaticas*, in continuation of former parts already given by this Society. Agreed that they be forwarded, the Society possessing several copies of the work in question.

3. From Captain G. L. Cooper, applying for a collection of fruit trees for the public gardens at Agra. Agreed that this application be met on the same terms as are accorded to Members of the Society.

4. From Dr. James Allan, dated Baugulpore, 8th November, respecting Horticultural operations at that station.

Submitted a letter from Mr. McMurray, Head Gardener of the Society, respecting the promised increase of pay to him from 125 to Rs. 150 after two years' approved services, ending in June last; and soliciting the opinion of the Society as to the conduct of his duties during that period.

Submitted the opinion of the Council that Mr. McMurray's services have met the approval of the Society, and that the increase of pay be recommended to the next General Meeting.

Proposed by Baboo Peary Chand Mittra, seconded by Mr. George Taylor, and *Resolved* —"That the increased salary to Mr. McMurray, the Head Gardener of the Society, recommended by the Council, be adopted, and that it commence from the expiration of the period of two years' service."

(*Saturday, the 18th of December,* 1852.)

W. G. Rose, Esq., Vice-President, in the chair.

The proceedings of the last General Meeting having been read and confirmed, the gentlemen who were proposed on that occasion were duly elected Members, viz., Lieutenant H. G. Jenkins, Meer Abdool Muzzeed, the Rev. W. Lipp, Capt. T. P. Sparkes, Mr. John Watson, and Baboo Sibchunder Mullick.

The names of the following gentlemen were submitted as desirous of joining the Society:—

W. H. Terraneau, Esq., Superintendent Salt Chokies, Calcutta,—proposed by Mr. W. G. Rose, seconded by Mr. W. Storm.

The Rev. E. Higgs, Deebroghur, Assam,—proposed by Capt. David Reid, seconded by Mr. Joseph Willis.

Presentations.

The following donations were announced:—

1. Report of the Bombay Chamber of Commerce for 1851-52. *Presented by the Chamber.*

2. Transactions of the Royal Society of Arts and Sciences of Mauritius, Vol. II, Part 3. (2 copies). *Presented by the Society.*

3. Journal of the Indian Archipelago, July and August, 1852. *Presented by the Editor.*

4. A copy of the above. *Presented by the Government of Bengal.*

5. Sixty-nine plants of 38 kinds, and a quantity of "Madras hedge" seed *Acacia lophantha* (?) *Presented by Sir Lawrence Peel.*

6. A few seeds of choice sorts of flowers and fruits procured at Liverpool. *Presented by W. Earle, Esq.*

7. A small collection of seeds from Cashmere, of vegetables, flowering annuals and shrubs, and a few bulbs. *Presented by Lieut. W. H. Lowther, 52 N. I.*

8. A few seeds of sweet chesnut. *Presented by Dr. Huffnagle.*

9. A fine specimen of the fruit of the "Neepa palm," (*Nipa fruticans.*) *Presented by J. Shaw, Esq.*

10. A ripe mangoe, the produce of his garden. *Presented by A. Emerson, Esq.* (A very well-tasted fruit, considering that it has been produced out of season.)

11. A specimen of Silk, the produce of the Punjaub, forwarded for a report by H. Cope, Esq. (Referred to the Silk Commitee.)

12. Forty-one samples of Woods from Cashmere. *Presented by Lieut. W. H. Lowther.*

13. Bark of a piece of drift timber from Assam, containing minute elastic fibres. *Presented by W. S. Hudson, Esq.*

A few cut specimen flowers of *Erythrina Christagalli*, from plants received last year from England. *Forwarded for inspection by Francisco Pereira, Esq.*

The Gardener's Monthly Report was submitted. Mr. McMurray announces that he has now ready for distribution to members 200 maunds of Chota Nagpore red yam, 5 or 6 maunds of Jerusalem artichoke, and a large quantity of arrowroot tubers, for which early applications are requested. Further, about 2,000 sugar canes of five sorts are available, at the usual rates. He states, in continuation of his former report on the treatment of pot herbs, that the shrubby or biennial kinds have stood very well through the hot and rainy seasons, without any protection, in the open ground, where they were planted in March last; and that several of the Thyme plants have flowered during November.

The Gardener gives a favorable return of the vegetable seeds from Messrs. Payne, Bridgewater and Co., of Southampton, which were submitted by Mr. Wingrove for trial and report; 30 out of 32 kinds having germinated fairly—a general per centage of 50. Of the flower seeds from the same quarter, 19 out of 32 kinds have germinated freely.

Mr. McMurray closes his report with a list of contributions of seeds and plants to the Garden from Dr. Chapman, Mr. Blyth, Mr. James Church, Senior, Mr. F. Pereira, Mr. G. Taylor, and Mr. L. Manley.

Read a report from Mr. Haworth on the sample of sheep's wool procured from the desert tracts of the district of Jung in the Punjaub, and which was submitted at the last General Meeting on behalf of the Agricultural and Horticultural Society of the Punjaub.

A long and interesting communication was submitted from Çapt. G. E. Hollings, Deputy Commissioner of Leia on the Indus, dated 16th November, on agricultural subjects generally, but more especially in regard to the fibre of the Mŭddār (Calotropis Hamiltonii) and the culture of cotton, tobacco and silk in various parts of the Punjaub. (Referred to the Committee of Papers.)

Read a letter from Baboo Peary Churn Sircar, Secretary Local Committee Public Instruction, Baraset, preferring an application for seeds and plants for the use of the Baraset Government School Garden.

It was agreed, on the recommendation of the Council, to comply with this application.

The Secretary having drawn the attention of the members present to the Testimonial voted to James Hume, Esq., late Honorary Secretary of the Society, which was placed on the table for their inspection, and which had been received while the Metcalfe Hall was under repair, the two following resolutions were passed in reference to it :—

First.—"That the President of the Society be requested to present the Testimonial to Mr. Hume, after it has been exhibited for a short period at the Society's Rooms, Metcalfe Hall, as proposed at a former Meeting."

Second. "That the special thanks of the Society be given to Dr. Wallich, for the great care and attention bestowed by him in so effectively carrying out its wishes in regard to the above Testimonial, and for the taste and judgment displayed in the emblematic figures of flowers and fruits by which it is so richly adorned."

Before the Meeting separated it was *resolved* : –

1. That the Garden Committee be requested to report to the next Meeting respecting consignments of seeds for 1853.

2. That the Floricultural Committee, and Fruit and Kitchen Garden Committee, be authorised to make the necessary arrangements respecting the approaching flower and vegetable shows

3. That the next or anniversary Meeting be held on Saturday, the 15th January, 1853, at 4 P. M.

Report from the Council to the Annual General Meeting, January the 15th, 1853.

The Council, in laying their Annual Report before the Members, at their present General Meeting, have the pleasure of recording that the affairs of the Agricultural and Horticultural Society of India continue to progress satisfactorily.

Though the number of Members (78) elected during the past year is not so great as in 1851, when an unusually large accession took place, yet it exceeds that of several other years, and may be considered a fair return, as will be observed on reference to the following tabular statement, which is given in continuation of former Reports, to show at a glance the constitution of the Society :—

CLASSIFICATION.	In 25 former years.	In 1846.	In 1847.	In 1848.	In 1849.	In 1850.	In 1851.	In 1852.	Gross Total.	Total real number at close of 1852 after deducting lapses.
Honorary Members, ...	11	1	0	1	0	0	0	1	14	10
Associate Members, ...	2	0	0	0	0	1	1	0	4	4
Corresponding Members, ...	0	1	0	0	0	0	1	1	3	3
Civilians, ...	232	13	15	22	8	10	22	16	338	150
Merchants and Traders, ...	201	14	12	13	10	14	20	12	296	116
Indigo and other Tropical Agriculturists, ...	190	15	6	5	1	9	19	13	258	88
Military Officers, ...	160	10	11	11	11	9	34	18	264	124
Medical Officers, ...	80	0	2	3	5	7	4	5	106	30
Asiatics, ...	63	2	14	5	6	9	8	8	115	51
Clergy, ...	14	1	0	0	0	2	1	1	19	6
Law Officers, ...	40	1	0	0	6	4	6	3	60	24
Miscellaneous, ...	9	0	2	0	2	2	6	0	21	17
	1002	58	62	60	49	67	122	78	1498	623

In the lapses alluded to in the last column, are comprized 17 deaths (an unusually large number) ; 27 resignations ; 4 whose names have been struck off for non-payment of subscriptions ; and 15 whose names have been removed from the list, in accordance with Section 6, of Ch. III of the Bye Laws, their absence from India having extended beyond four years :—making in all 63.

Of the above-mentioned number (623), 37 are Members who have compounded for their subscriptions ; 54 are absent from India, and consequently non-paying ; 10 are Honorary ; 3 Corresponding, and 4

Associate Members—in all 108; leaving 515 as the actual number of *paying* Members on the books of the Society on the 1st January 1853, or 20 more than last year.

In alluding to the casualties of the past year, the Council desire to express, most prominently, their regret at the severe loss which the Society has sustained by the demise of Lt.-Col. T. E. A. Napleton, late of the 13th N. I. The proceedings of the Society for several years past fully prove the great interest he took in the promotion of Agriculture and Horticulture in India, as evinced in his exertions in the cause, first at Bhaugulpore and afterwards at Delhi. The following resolution, passed at a General Meeting in February,—and which the Council desire again to record in this place—shews how these services were appreciated:—

"That this Society, on holding its first Meeting after the receipt of the intelligence of the lamented death of Lt.-Col. T. E. A. Napleton, the founder of the Branch Agricultural and Horticultural Societies of Bhaugulpore and Delhi, is desirous of putting on record its sense of the valuable services rendered by him to the cause of Agriculture and Horticulture in India, and of expressing its deep regret at the loss which that cause has sustained by the demise of so zealous and useful a member and correspondent."

The other members whose death the Council have to notify are Mr. F. W. Russell of the Civil Service, and Baboo Radamadub Banerjea,—two of the oldest Subscribers to the Society; Mr. J. G. French, Deputy-Magistrate of Dacca, an useful and obliging correspondent; Capt. A. Thompson, a practical member, who was always willing to assist the Society, more especially in the department of fibrous materials; Baboos Sreekissen Mulliek and Hemnath Roy, both of Calcutta; Dr. Alexander Greig, of the Medical Service; Mr. J. L. Russell, Merchant, Calcutta; Mr. Henry Torrens, of the Civil Service; Mr. James Sinclair, of Calcutta; Mr. H. Rehling, Indigo planter, Rungpore; Mr. A. C. Plowden, of the Civil Service; Sirdar Nihal Sing, of Kuparatolla, in the Punjaub; Dr. J. G. Denham, of the Medical Service; Mr. Gilbert Farie, Merchant, and the Rajah Jadubkissen Bahadoor, of Calcutta.

Before leaving this portion of their Report (the internal economy of the Society), the Council desire to notice the addition, during 1852, of the name of Lieut.-Col. Francis Jenkins, Commissioner of Assam, to the list of Honorary Members, "in acknowledgment of his long, unremitting and valuable services in the cause of Agriculture and Horticulture."

The subject to which the Council have next to refer is the Finances which, they are happy to observe, continue in a satisfactory state. The usual annual statement of receipts and disbursements, vested fund and liabilities, is appended to this report. The total receipts amount, it will be seen, to Co.'s Rs. 24,007-11-9, (or Rs. 2,377 more than the amount received in 1851) to which sum the balance of the previous year, Co.'s Rs. 1,122-9-2, is to be added, forming a total of Co.'s Rs. 25,130-4-11. The disbursements during the year have amounted to Co.'s Rs. 23,921-14-6, leaving a cash balance, in the Bank of Bengal, in the hands of the Government Agent, and with the Secretary, of Co's Rs. 1,208-6-5.

The Vested Fund in the hands of the Government Agent, as per account rendered to 31st December 1852, amounts to Co.'s Rs. 22,366-10-8 in the 4 and 5 per cent. Government Loans.

The items of Receipts and Disbursements are so fully detailed in the above mentioned statement, that it is, the Council conceive, unnecessary to allude further to them in this place than to draw attention to the sum of Co.'s Rs. 1,368-8, exhibited as a debit on account of the Society's proportion of expense for the periodical general repairs to the Metcalfe Hall, the other moiety of which has been borne by the Public Library.

In regard to the arrears of Subscription, it is gratifying to note that, of the total amount of Co's Rs. 6,278-13-6, shewn due at the end of 1851, there has been realized, during the past year, the sum of Co.'s Rs. 3,229-2-6, still leaving a balance of Co.'s Rs. 3,049-11, of which the sum of Co.'s Rs. 1,087-8 may be considered as irrecoverable, Co.'s Rs. 390 thereof being the arrears due from the 4 defaulters before alluded to, and the remainder being composed of the arrears of deceased and insolvent Members, and of some who have retired from India. The balance of these arrears, after the deduction above noted, is Co.'s Rs. 1,962-3, and the unpaid subscriptions for 1852 amount to Co.'s Rs. 4,731-0-9, forming a total due to the Society, at the end of the year, of Co.'s Rs. 6,693-3-9, as explained in lists No. 1 to 4.

The Liabilities of the Society are Co.'s Rs. 6,550, being balance of cost of seeds for the past season; these will be fully liquidated by arrears due for subscription; for seeds, grafts, &c., disposed of by the Society; and the cash balance, which form a total of Co.'s Rs. 8,951-1-8.

With respect to the usual annual exhibitions of flowers, vegetables and fruits, it may be noted that the first was held, as in 1851, under tents, in the Auckland garden, on the 5th February; the second and third shows, which were confined to flowers, were held in the Town Hall on the 6th March and 10th April, tents not being available. It was also proposed to have a separate show of vegetables and fruits in the same locality on the 15th May, the Town-Hall not being sufficiently large to accommodate both together, but the severe gale of that day prevented its being held. The total amount awarded was Co.'s Rs. 725 and one silver-medal. The Report on the first show, especially in regard to the vegetable department, was most favorable; the competition was also great. The display of the 5th February was decidedly the best in respect to flowers, more especially to the orchid tribe, which were well represented, shewing a decided improvement on the shows of 1851.

The distribution from the Nursery Garden of flowering plants, fruit grafts, and useful cultures, has been constant during the past year. It may be here added, by way of record, that during 12 months, that is to say from June 1851 to May 1852, upwards of 11,000 plants were distributed, exclusive of a quantity of sugar-cane and tuberous and bulbous roots. Since that period to the close of the year, 4,000 more plants have been destributed, besides roots of sorts and sugar cane cuttings. The Society is indebted to several Members for contributions; but more particularly would the Council take this opportunity of acknowledging its obligations to Mr. Arbuthnot Emerson for his constant donations to the Garden.

Allusion was made in the last Report to the proposed establishment of a New Garden on the Calcutta side of the river, in place of the present Garden on the opposite side, which is considered too remote to be frequently visited by Members and the public generally. The Council have only to add on this occasion, that the sum of Co.'s Rs. 11,000 has been subscribed up to the present time towards this object, in addition to the amount (Co.'s Rs. 12,000) voted from the funds of the Society; and that a suitable locality has not yet been obtained.

The importations, during the past season, of vegetable and flower seeds from North America, the Cape, and Great Britain have, the Council are glad to observe, proved of very fair quality, and given satisfaction so far as they have had the means of ascertaining. The flower seeds from Mr. Carter of Holborn have germinated readily, and the American seeds continue to support their previous high character, and are much in request by Members resident in all parts of the country, but more especially in Upper India and the Punjab. The quantity which was ordered in 1851 is larger than any previous supplies received by the Society.

Among other subjects that have been considered during the year, the introduction into India of the Quinine-yielding Cinchonas of South America is a most important one. On this point a reference was made to the Government of India, which has been favorably received and submitted to the Hon'ble the Court of Directors with the recommendation of the Governor-General in Council.

The question of a Treatise on Practical Gardening, as applicable to Bengal, which has long been a desideratum, has also come before the Society; and after due consideration, it was agreed, at a General Meeting held in May, that a premium of one thousand rupees should be offered for such a work, subject to certain conditions, which the Council re-introduce in this Report with the view of giving them additional publicity:—

"1. The Treatise must be as plain and untechnical as the nature of the subject will admit.

"2. It must treat fully on the culture of fruits, vegetables, and flowers of all descriptions, whether indigenous, or such as have been introduced into Bengal to the present time; giving practical hints on grafting, budding, pruning, propagating, transplanting, &c., with descriptions of manures,—vegetable and animal,—best adapted to certain plants. A calendar of operations for every month throughout the year must form an appendix to the work, and it must also have a copious alphabetical index.

"3. Intending competitors must submit their Treatises on, or before, the 1st June 1854.

"4. The author shall have the option of publishing the successful Treatise in such a form as the Society may determine, within six months after the announcement of the award, with entire interest in the copyright; or in case of his declining the risk, the Society shall be at liberty to publish the Treatise in its Journal, or separately, as may be deemed expedient; the entire interest in the copyright, in that case, to be vested in the Society.

"5. The Society shall have the option of publishing a Bengalee Translation of the above work at its discretion.

"6. The Society reserves to itself the right of withholding the above premium, should none of the treatises be approved of by the Committee which will be appointed to report on them."

Only two Nos. of the Journal,—Parts 1 and 2 of Vol. VIII, have been published during the year, but they contain several interesting papers on sugar, coffee, cotton, tobacco, wool, fibrous specimens of sorts, &c. It has been agreed to bring out these parts, in future, irrespective of size, and at least once a quarter.

Allusion was made, in the last annual Report, to the Testimonial voted to James Hume, Esq., in token of his services as Honorary Secretary of the Society during a period of 8 years. It may now be mentioned, by way of record, that the Testimonial in question,—a breakfast-service in silver,—has been received and duly presented to Mr. Hume by a deputation appointed at a Meeting of the Subscribers.

Statement of Receipts and Disbursements of the Agricultural and Horticultural Society of India from 1st January to 31st December, 1852.

RECEIPTS.

From Members, subscriptions collected during the year, ...	Co.'s Rs.			15,534	9	9
,, The Most Noble the Marquis of Dalhousie, annual donation for the years 1851-52, ...	1,000	0	0			
,, Government, annual donation, ...	1,045	0	0			
,, Ditto, monthly allowance for 12 months, at 135-13-6 per month, ...	1,630	2	0			
,, Sir Lawrence Peel, annual donation, ...	400	0	0			
				4,075	2	0
,, Accruings of Interest on fixed assets, ...				1,010	0	0
,, Proceeds of Sugar-cane delivered from the Nursery Garden, including the cost of packing, ...	67	7	6			
,, Ditto, of Mango, &c, grafts, ditto from ditto, ...	582	11	0			
,, Ditto, of 9 maunds and 24 seers of Jute raised in the Garden,	14	6	3			
,, Ditto of a proportion of surplus Cape and American vegetable and English flower seeds, bulbs and fruit seeds, of 1851-52,	2,480	9	6			
,, Proceeds of copies of Transactions of the Society, ...	24	0	0			
,, Ditto of copies of the Journal, ...	51	6	6			
,, Ditto of copy of Fenwick's Hand-book of Gardening, ...	2	0	0			
,, Ditto of old seed boxes, &c., ...	38	3	0			
,, Members, amount of freight, &c., repaid on boxes of seeds forwarded to their addresses in 1851-52, ...	59	14	0			
,, Members, amount repaid for postages, &c , packing charges for seeds, &c., ...	67	6	3			
				3,388	0	0
Total Receipts, Co.'s Rs.				24,007	11	9
By Balance in the Bank of Bengal on 31st December, 1851, ...	677	12	6			
,, Ditto in the hands of Government Agent on ditto, ...	417	10	8			
,, Ditto in the hands of Secretary, ...	27	2	0			
				1,122	9	2
Grand Total, Co.'s Rs.				25,130	4	11

DISBURSEMENTS.

Foreign Vegetable and Flower Seeds.

By Messers. C. N. Villet, for Cape garden-seeds supplied in 1852, ..	2,615	8	0			
,, Mr. D. Landreth, for American garden, cotton, and maize seeds supplied in 1851, ...	3,334	11	8			
,, Messrs. Lawson and Sons, for Scotch vegetable seeds supplied in 1851, ...	412	3	2			
,, Mr. James Carter, in part payment for English seeds supplied in 1852, ...	1,322	7	0			
,, Mr. T. P. Woodcock, for a box of Australian seeds supplied in 1852, ...	58	15	4			
				7,743	13	2

MEDALS.

By Messrs. Hamilton and Co., for supplying 3 silver medals, ...		36 0 0

LIBRARY.

,, Books purchased during the year for the Library, ...	262 7 0	
,, Binding books during the year, ...	26 2 0	
		288 9 0

PRINTING.

,, Sundry parties, for printing receipts and schedules of prizes for flower shows, circular letters, &c. &c., ...		187 12 0

JOURNAL.

,, Bishop's College Press, for printing Parts 1 and 2 of Vol. VIII, ...		767 0 0

NURSERY GARDEN.

,, Ordinary expences, incurred on account of the Nursery Garden from 1st December, 1851, to 30th November, 1852, ...	3,268 13 9	
,, Extra ditto, for rebuilding the conservatory blown down by the May gale, erecting a temporary conservatory, repairing sheds and for purchase of fruit seedlings, for grafting, for pots, tools, medicine, &c., ...	642 8 0	
		3,911 5 9

ESTABLISHMENT.

,, Amount for Establishment from 1st December, 1851, to 30th November, 1852, ...		5,643 11 6

PECUNIARY REWARDS.

,, Prizes to Mallees for vegetables and fruits at the Exhibition held on the 5th February, 1852, ...	294 0 0	
,, Ditto to ditto for flowers at the Exhibitions held on the 5th February, 6th March and 10th April, 1852, ...	431 0 0	
,, Bhaugulpore Branch Society's annual donation for 1851, ..	50 0 0	
		775 0 0

ADVERTISEMENTS.

,, Advertising in the Calcutta and Up-country Newspapers, notices of General Meetings, of Shows of vegetables and flowers, distribution of seeds, &c., &c.		641 5 0

STATIONERY.

,, Stationery for office books, and for the use of the office, ..	52 12 0	
,, Brown packing papers, for packing seeds, ...	188 6 6	
		241 2 6

FREIGHT.

,, Freight on boxes of seeds, books, &c., sent and received from the Cape of Good Hope, America, &c., ...		400 4 9

METCALFE HALL.

By Society's proportion of Assessment on Metcalfe Hall, from November, 1851, to October, 1852, ...		124 11	
,, Burn and Co., Society's proportion of cost for giving a thorough repair to the Metcalfe Hall Premises, ...		1,358 8	
,, Ditto, Society's proportion of quarterly allowance for inspecting the Metcalfe Hall, from August 1851 to June 1852, .		55 0 0	
,, Sundry parties for various articles of furniture, .. .		100 0 0	
,, Matman for supplying new mats after the general repair, .		136 0 0	
,, Jessop and Co., for repairing, &c., Iron key for outer gate lock,.		0 12 0	
			784 15 0

MACHINERY ACCOUNT.

,, Mr. F. N. DeGarnier, for repairing and cleaning Cotton Machines,		50 0 0	
,, Messrs. Jessop and Co., for repairing and fitting do., ...		8 14 0	
			58 14 0

POSTAGE AND SUNDRY OTHER CHARGES.

,, Postage on letters, &c., sent and received, and on copies of the Journal, and for petty expences, ...		794 11 6	
,, Extra packermen for subdividing seeds, ...		38 13 0	
,, For expences incurred in putting up a fence round a portion of the Auckland Circus, for superintending the erection of tents for flower and vegetable shows, ...		87 1 0	
,, Presents to Constables for attending at Horticultural and Floricultural Exhibitions during the year, ...		40 0 0	
,, Mrs. D'Cruz, in full of her gratuity, ...	60 0 0		
,, Ditto, donation awarded by order of General Meeting,	200 0 0		
		260 0 0	
,, Government Agents' commission, brokerage, &c., charges during the year, ...		5 8 4	
,, Dr. Walker, refund subscription paid by him on 15th October, 1852, on account of Brigadier Penny, ...		16 0 0	
Total Disbursement, Co.'s Rs.			23,921 14 6
,, Balance in the Bank of Bengal on 31st December, 1852, ..		871 13 7	
,, Ditto in the hands of Government Agent ditto, ...		322 2 4	
,, Ditto in the hands of Secretary ditto, ...		14 6 6	
			1,208 6 5
Grand Total, Co.'s Rs.			25,130 4 11

MEMORANDUM

DISBURSEMENTS.

To Amount of Disbursements during the year 1852, as per Statement, ...		23,921 14 6
,, Balance in the Bank of Bengal on 31st December, 1852, ...	871 13 7	
,, Ditto in the hands of Government Agent on ditto, ...	322 2 4	
,, Ditto in the hands of Secretary on ditto, ...	14 6 6	
		1,206 6 5
Total, Co.'s Rupees, ...		... 25,130 4 11

RECEIPTS.

By Amount of Receipts during the year 1852, as per Statement		24,007 11 9
,, Balance in the Bank of Bengal on 31st December, 1852	667 12 6	
,, Ditto in the hands of Government Agent on ditto, ...	417 10 8	
,, Ditto in the hands of Secretary ditto, ...	27 2 0	
		1,122 9 2
Total, Co.'s Rs. ...		... 25,130 4 11

LIABILITIES.

Amount due by the Society for American vegetable, &c., seeds in 1852, ...	Sp. D. 1,995 58 0=	4,000 0 0
Ditto for Edinburgh vegetable seeds ditto, ...	£ 88 16 10=	890 0 0
Balance on account of English flower seed do.,	£ 165 19 10=	1,660 0 0
	Co.'s Rs.	6,550 0 0
Amount voted towards the fund for the formation of a Garden on the Calcutta side, ...		... 12,000 0 0

DEPENDENCIES.

Amount invested in Government Securities lodged in the Government Agency Office, ...		22,366 10 8
Amount of Subscription in arrear, ...	6,693 3 9	
Amount of outstandings for seeds, grafts, copies of the Journal, &c., ...	1,052 7 6	
		7,745 11 3

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of July, 1862.

July. Days of the Month.	Moon's Phases.	Observed at 9 H 50 M.					Observations made at Apparent Noon					Observed at 4 P. M.					Observations made at Sunset					Rain Gauges.	
		Barometer reduced to 32 Fahrenheit	Temperature			Wind.	Barometer reduced to 32 Fahrenheit	Temperature			Wind	Barometer reduced to 32 Fahrenheit	Temperature			Wind	Barometer reduced to 32 Fahrenheit	Temperature			Wind	Elevation.	
			Of the Mercury.	Of the Air	Of Wet Bulb	Direction at 9 h 50 m		Of the Mercury	Of the Air.	Of Wet Bulb	Direction at Noon		Of the Mercury	Of the Air	Of Wet Bulb	Direction at 4 p. m		Of the Mercury	Of the Air	Of Wet Bulb	Direction at Sunset	Feet 60. Upper.	Feet 5. Lower
		Inches.	°	°	°		Inches.	°	°	°		Inches.	°	°	°		Inches	°	°	°		Inches	Inches
1	⊙	29.621	81.2	82.3	80.2	S.	29.587	85.6	87.5	82.0	S.	29.536	[illegible]	82.0	80.5	S.	29.532	80.6	81.0	79.5	S	0.48	0.53
2		.584	84.6	86.2	82.2	S. S. W.	.556	88.3	89.0	82.4	S. S. W.	.481	88.0	88.0	82.8	S. S. E.	.516	86.0	85.6	82.6	Ditto	0.05	0.07
3		.575	83.5	84.4	81.0	S. W.	.552	86.1	87.0	81.8	S. W.	.488	84.0	83.0	81.3	S. E.	.529	81.3	81.0	79.6	S. W.	1.36	1.42
4S.		.576	80.6	81.2	79.3	W. S. W.	.584	83.2	84.8	80.8	Ditto	.545	86.0	86.5	81.6	S.	.509	84.4	83.8	81.0	S. S. E.	0.60	0.61
5		.538	83.7	84.7	82.2	S.	.494	85.9	88.2	82.0	W. S. W.	.420	89.4	89.2	84.2	Ditto.	.429	85.8	85.6	82.0	S.	...	...
6		.458	84.0	85.2	81.2	S. S. W.	.456	86.8	87.4	81.9	Ditto.	.355	87.3	87.4	82.6	Ditto	.376	83.3	83.0	81.0	Ditto.	0.20	0.22
7		.414	83.8	86.1	82.3	S.	.375	87.6	88.4	82.3	S. W.	.318	86.4	87.9	82.9	W. S. W.	.336	85.2	84.6	81.3	S. W.	0.27	0.29
8		.359	82.0	84.2	81.0	W. S. W.	.326	84.9	84.4	81.0	W. S. W.	[illegible]	81.3	80.2	79.4	W. S. W.	.311	80.3	80.5	80.0	W.	2.20	2.24
9	☽	.348	79.4	80.0	79.2	S. W.	.323	81.0	82.2	80.6	S.	.291	83.0	82.9	81.2	S.	.337	83.2	82.0	80.4	S. W.	...	...
10		.530	83.7	85.2	82.4	S.	.522	85.4	86.3	83.3	Ditto.	.510	85.2	85.3	82.3	S. S. E.	.538	85.0	84.8	82.6	S.	...	...
11S.		.629	86.7	88.0	83.2	Ditto.	.615	88.6	89.6	83.8	S. S. E.	.533	87.9	87.5	85.2	Ditto.	.537	86.3	85.6	81.6	Ditto.	0.09	0.10
12		.598	81.4	81.4	79.6	S. S. E.	.595	81.3	81.3	79.6	S. S. W.	.527	83.8	84.0	80.6	S.	.532	83.0	83.0	80.8	Ditto.	1.00	1.10
13		.643	80.0	80.3	79.2	S. W.	.635	80.0	80.4	73.0	S. W.	.586	83.0	83.6	80.2	S. W.	.605	82.6	82.7	80.2	S. S. W.	0.57	0.63
14		.686	84.4	85.6	81.9	Ditto.	.668	87.5	88.2	81.0	Ditto.	.594	89.6	85.8	80.2	E.	.632	82.0	83.0	81.3	S. W.	2.92	2.96
15		.689	82.4	84.3	80.2	W. S. W.	.659	85.3	86.3	81.4	Ditto	.583	87.0	87.6	83.4	S. S. W.	.631	81.5	80.2	78.6	S.	1.08	1.12
16		.712	81.3	82.2	79.1	S. W.	.703	80.2	[illegible]	77.8	S.	.609	83.4	84.2	81.6	S. S. E.	.618	83.6	83.0	80.4	Ditto.	0.25	0.28
17	●	.674	82.1	83.2	79.7	Ditto	.643	83.2	83.0	80.2	Ditto	.581	81.3	81.3	79.0	S.	.607	81.8	81.2	78.4	Ditto	...	...
18S		.659	83.9	85.3	81.3	S. S. W.	.653	87.0	88.3	81.6	S. W.	.590	85.4	85.4	80.7	Ditto.	.605	84.2	84.4	80.4	Ditto.	2.00	2.00
19		.719	79.4	80.2	78.0	S. W.	.713	81.6	82.8	79.7	Ditto.	.680	81.4	81.9	79.2	S. W.	.674	81.4	81.8	78.6	S. S. W.	2.61	2.66
20		.782	78.6	79.3	76.8	W. S. W.	.769	80.7	81.2	78.0	Ditto.	.718	81.4	81.6	79.1	S.	.699	81.0	81.0	73.4	Ditto.	...	...
21		.752	84.1	84.9	81.0	S. W.	.725	85.3	86.0	80.9	Ditto.	.654	86.4	86.0	80.0	Ditto.	.660	83.4	83.2	79.3	S.	0.09	0.12
22		.707	81.2	81.6	78.0	S.	.703	82.9	84.0	79.3	S.	.627	86.1	86.2	80.0	Ditto	.643	83.8	83.8	79.2	Ditto.	...	...
23		.732	84.9	86.3	81.8	S. E.	.695	87.0	86.8	82.2	Ditto.	.650	85.0	86.0	80.3	Ditto.	.684	82.0	80.6	78.0	E.	0.40	0.42
24	☾	.767	82.9	84.1	81.2	E.	.743	82.9	82.4	79.4	E. S. E	.678	82.6	82.0	79.6	Ditto.	.692	80.6	80.2	78.4	S.	...	...
25S.		.748	83.3	85.0	80.3	S. E.	.722	85.2	86.3	81.3	S. E	.634	85.0	84.5	80.8	S. E.	.670	82.7	82.6	79.2	S. S. E.	0.49	0.50
26		.680	81.4	83.0	81.6	Ditto.	.645	82.8	84.0	81.4	S. S. W	.540	86.3	86.2	81.2	S.	.557	84.8	84.6	80.4	S.	0.07	0.07
27		.594	83.6	84.0	80.4	Ditto.	.563	85.6	86.8	80.7	E. N. E.	.473	85.2	85.0	82.0	E.	.521	83.6	83.5	80.7	S. E.	0.12	0.12
28		.609	83.8	84.2	81.3	E	.583	87.2	86.0	81.3	S. E.	.535	85.2	85.3	81.0	S. E.	.547	83.5	84.0	80.8	E. S. E.	...	...
29		.613	83.8	86.0	81.6	Ditto	.601	86.9	88.3	82.8	E. S. E	.529	87.2	86.8	81.0	E. N. E.	.561	84.8	84.7	79.2	E. N. E.	0.50	0.52
30		.651	84.0	85.2	81.2	E. N. E.	.645	83.0	83.0	80.8	Ditto.	.561	85.2	84.6	80.2	E. S. E.	.563	84.2	84.0	79.6	S. E.	...	...
31	⊙	.656	84.8	86.0	80.4	E. S. E.	.616	86.6	89.0	82.6	N. E.	.543	86.4	87.0	80.0	Ditto.	.572	83.0	83.2	79.0	E. S. E.	...	...
Mean,		29.623	82.7	83.9	80.6		29.600	83.8	85.8	81.1		29.536	85.1	85.0	81.0		29.556	83.2	83.0	81.0		17.35	17.98
f the ding last		29.620	84.1	84.9	80.7		29.594	86.4	86.8	81.4		29.520	86.2	86.1	81.3		29.546	84.4	83.9	80.0		11.77	12.89

These Observations have been made, for the most part, with a supply of new and first rate Instruments, receive o the Observatory, by orders of the Bengal Government. A brief description of the Instruments seems necessary.

[illegible]

August, Days of the Month.	Moon's Phases.	Observed at 9 H 50 M.					Observations made at Apparent Noon.					Observed at 4 P M					Observations made at Sunset.					Rain Gauges.	
		Barometer reduced to 32° Fahrenheit.	Temperature.			Wind.	Barometer reduced to 32° Fahrenheit.	Temperature.			Wind.	Barometer reduced to 32 Fahrenheit	Temperature.			Wind.	Barometer reduced to 32° Fahrenheit.	Temperature.			Wind.	Elevation.	
			Of the Mercury.	Of the Air.	Of Wet Bulb.	Direction at 9 h. 50 m.		Of the Mercury.	Of the Air	Of Wet Bulb	Direction at Noon.		Of the Mercury.	Of the Air.	Of Wet Bulb.	Direction at 4 p m.		Of the Mercury.	Of the Air.	Of Wet Bulb.	Direction at Sunset.	Feet. 60. Upper.	Feet. 5. Lower.
		Inches	o	o	o		Inches.	o	o	o		Inches.	o	o	o		Inches.	o	o	o		Inches	Inches
1S		29 637	84.6	85.8	80 6	E. N. E	29 597	88.0	89.2	81.2	E. N. E.	29.509	88 0	88.4	80 4	E. N. E.	29 530	86.0	85.5	80.1	E. ..	0.13	0 14
2		.589	85 6	87 3	80 8	E. ..	.536	89 2	90.3	82 0	Ditto. ..	.479	88 0	87.3	81.8	Ditto. ..	.515	86 8	86.2	79.3	S. E. ..	0 14	0.14
3		.557	85.0	86 6	81.0	N. E. .	.521	87 7	88 8	82.4	N. E ..	.477	81 5	84.2	82.0	Ditto. ..	490	84.0	83 0	81.0	E. ..	0.36	0 36
4		.562	84.4	85 4	81 4	Ditto. .	.537	86.8	86 9	82.0	E N. E.	.475	84.8	84 8	80.9	S. E. ..	.488	83 8	83 5	79.8	S. E. ..	..	..
5		.541	84.3	85 4	81 3	E. .	.510	88.5	90 2	82 8	S. E. .	.462	83 2	83 3	81 2	E. S. E.	.461	83.4	83.8	79.8	Ditto. ..	0.94	0 96
6		.525	80.4	81 2	79 5	E. S. E.	.492	83.0	82.7	80 2	E. S. E	.455	83.6	84 2	80 6	S. E. ..	.462	82 8	82.9	80.2	Ditto. ..	1.28	1.80
7		.606	79 2	80 0	79 0	E. ...	593	81.2	80.2	80 0	Ditto. ..	.560	80 2	79 6	78 4	Ditto. ...	.584	78.9	79.0	78.4	Ditto. .	0.58	0.59
8S.	☽	.689	80.2	80 2	79.3	S. E. ..	.644	81 4	82 4	80 4	Ditto. ..	.579	83 9	84 2	81.3	Ditto. ...	.563	82 6	82 4	80.8	E S. E.	...	...
9		.625	83.2	84.6	80.5	E. N. E.	.585	86 9	88.0	82.4	N. E. ..	.517	86 6	88 4	80 6	Ditto ..	503	81.4	81 8	80 4	Ditto. ..	0.33	0 34
10		.587	84 7	85 7	81 4	Ditto. ..	.558	87 4	89 3	82.6	Ditto. .	478	86 3	83 8	81 4	N. E. ..	487	81.0	81.5	80.0	N E. ...	1.00	1.03
11		563	80.8	80 5	79.2	N E. .	530	83.0	84 0	81 4	Ditto. .	.445	83 6	81 8	80 6	S. .	.485	81 3	81.8	80.6	N. ..	0.81	0.85
12		.524	85.3	86.0	82.0	Ditto.	.481	88 2	89.0	83 4	N. N. E.	.424	84.7	84 2	82 2	N. E. ...	.461	84.3	84 8	83.0	Ditto. ..	0.22	0.23
13		.517	85.0	86 0	82 0	N N. E.	.467	87 4	88 3	83.0	N. E	.389	88 5	85.3	82 0	E. S. E.	.417	88 4	84 3	80.4	E. N. E.	0.35	0.38
14		.548	81 6	82 4	80 6	E. ..	.545	82 1	82 2	81.1	E. S. E.	.485	84 5	85 0	81.2	S. E. ...	542	82 8	82 8	80 2	S. E. .	0 26	0 30
15S.	●	.697	83.7	86.0	81 8	E S. E.	.696	85 0	83 4	80 2	S. ..	.507	84.9	86.5	82.0	Ditto. ..	.627	86 0	85.6	82 4	S. S. E.	0 26	0.27
16		.693	85.4	86 6	82.0	W. S. W.	.660	87 9	89 0	83 0	S. E. ..	.563	89 4	89 0	83 4	S. S. E	.589	86 9	86 8	82.2	Ditto. ..	..	..
17		.656	85 6	86 8	82 4	S. E. .	.642	88 2	89 8	83 0	E ...	.575	84 0	81.8	79.6	S. ..	584	83.0	83 6	82.3	E. ...	0 42	0.44
18		.661	83.7	84.0	82.0	S. S. W	663	82 4	82 4	81.0	S W. .	.585	84 0	84 0	81.3	S. E. .	.602	82.8	82.7	80 7	S. E. ...	0.04	0.05
19		.701	85 3	86.0	81 8	S. E. . .	682	87.5	88 2	82.6	S. E ..	.604	88.0	88.2	82 4	S. S. E	.633	85 9	85 4	81.0	Ditto. .	...	..
20		.761	83.6	84.5	81 3	E N. E.	.742	84 0	84 4	81 0	E ...	.651	85 3	85.0	80 7	E. S E	667	83 7	83.8	80.6	S. S. E.	0 14	0 13
21		.738	83.8	85 0	81 4	E. ...	.723	85 8	86 2	81.6	Ditto ...	.642	83.0	83 4	79.5	S. E. ..	.664	82.6	82.6	79 3	E. S. E	0.47	0.38
22S.	☾	.801	81.3	85.2	78 2	Ditto. ..	.786	83.4	85 0	81 0	Ditto. ..	712	83.4	84 4	81 2	E. .	.707	84 0	82.8	79 9	S. E. ..	...	...
23		.767	82.8	83.6	80.2	S. E. ..	.752	84.7	86 0	81.4	S. E. ..	678	83 6	84.3	80.9	S. ..	.689	82 9	82 8	79.6	S. ..	0 37	0.37
24		.764	83 4	85.0	81 0	Ditto. .	.740	83 8	83.8	82 6	S ..	661	83.7	84 0	80 0	S. S. E.	.638	83 4	83.4	80 6	Ditto. ..	..	..
25		.797	84.4	86.3	81 3	Ditto ..	777	86 2	84 0	80 6	S. E. ..	.685	84 9	84 6	81.3	S. E. ..	.714	83 5	83 4	80.6	Ditto. ..	0.22	0 20
26		.818	82.0	82.4	80 2	S. ..	.798	86.3	87.8	82.4	S. ..	.709	87.5	88.2	82.2	S. ..	.730	85 6	85.0	80 0	Ditto. . .	...	...
27		.782	85.6	86.9	83.2	Ditto	.746	88 6	89.8	83 7	Ditto .	673	87.6	87 3	82 8	Ditto ..	.689	83 7	82 8	80.2	Ditto. ..	0 08	0.10
28		.762	84 2	85 2	81 6	S. S. W.	.721	85 8	86 8	82 2	S. W.	.638	87.4	88.0	83.0	S. W. ..	.676	85.6	84.4	81.4	N. W. ..	0.28	0.28
29S.	☉	758	81 8	83 0	80 2	W. ..	.7[illegible]6	85 0	86.0	81 6	W. N. W.	.625	88 4	89 3	82 0	W. ..	.634	87 5	87.0	83 0	S ..	0·57	0.58
30		.712	85 0	85.2	82 0	N. .	.685	87 2	88 8	83 8	N. ...	600	89 0	88.6	83 4	N ..	.610	86 6	86.4	82 8	N. W. ..	0 48	0.53
31		.703	85.3	87 0	83.0	Ditto. ..	.671	86 7	88 0	82 6	Ditto ...	.559	87 0	86.4	82 5	S W.	.607	84.7	84. 2	81.3	E. ..	. .	...
Mean,		29.665	83.6	84.7	81.1		29.639	85 8	86.5	81 9		29 565	85 6	85.4	81.4		29.584	84 0	83 7	80.7		9 63	9.95
f the ıding		29.650	85 9	86 3	82 0		29 623	87.7	88.3	82 3		29 542	87 6	87 5	82 0		29 567	85.7	85.0	81.1		9 80	10 78

These Observations have been made for the most part with a supply of new and first-rate Instruments, receit
he Observatory, by orders of the Bengal Government. A brief description of the Instruments seems necessary.
Barometer by Troughton, used prior to the 1st June, 1844. Observations reduced to 32° Fah. = 29.493

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of September, 1852.

Sept. Days of the Month.	Moon's Phases.	Observations made at 9 h. 50 m.					Observations made at Apparent Noon					Observations made at 4 P. M.					Observations made at Sunset					Rain Gauges	
		Barometer reduced to 32 Fahrenheit.	Temperature			Wind.	Barometer reduced to 32 Fahrenheit.	Temperature			Wind	Barometer reduced to 32 Fahrenheit	Temperature			Wind	Barometer reduced to 32 Fahrenheit	Temperature			Wind	Elevation	
			Of the Mercury.	Of the Air.	Of Wet Bulb	Direction at 9 h 50 m		Of the Mercury.	Of the Air	Of Wet Bulb	Direction at Noon		Of the Mercury.	Of the Air.	Of Wet Bulb	Direction at 4 p. m		Of the Mercury	Of the Air	Of Wet Bulb	Direction at Sunset	Feet 60. Upper.	Feet 5. Lower
		Inches.	o	o	o		Inches.	o	o	o		Inches.	o	o	o		Inches	o	o	o		Inches	Inches
1		29.724	85.6	87.0	82.6	S. S. E.	29.697	86.7	86.6	82.8	N. N. W.	29.618	89.6	91.2	82.7	S. ..	29.631	87.0	86.9	82.6	S. ..		
2		.744	84.9	85.9	81.3	S. ..	.716	87.8	89.4	81.2	E ...	.626	87.4	85.6	82.3	E. S. E	.636	84.8	84.8	81.0	S. E .	.	.
3		.709	86.3	88.0	82.0	N. ..	.678	89.0	91.0	82.2	N. .	.555	90.4	91.0	83.8	N. E. .	.554	89.0	88.7	83.6	E. S. E.	...	.
4		.583	88.0	89.8	84.2	Ditto. .	.545	91.2	93.0	85.4	Ditto .	.469	89.9	8.99	81.6	E. N. E	.518	86.0	85.4	79.0	N. E. .	.	
5S		.690	79.3	79.5	78.3	E. N. E.	.690	79.7	80.2	78.6	E. S. E	.669	77.8	77.8	76.8	E. .	.664	78.4	78.4	77.6	E	1.91	1.93
6		.810	82.6	84.5	82.0	S. E. .	.796	84.8	85.3	81.5	S. S. E	.710	87.0	87.0	82.3	S. .	.727	84.5	84.4	81.8	S.	1.38	1.40
7	☽	.796	85.2	85.8	82.3	S. W. ...	.760	88.0	89.8	82.8	W. S. W.	.662	90.5	92.0	83.7	W. .	.661	90.0	89.3	83.8	Ditto. .	..	...
8		.775	85.4	86.3	83.0	Ditto. .	.743	88.4	89.2	84.0	S. W. ..	.625	88.6	88.2	83.0	S. W.	.689	81.2	80.3	78.2	Ditto .	.	.
9		.831	80.2	80.4	79.5	S. E. ..	.768	81.7	83.2	81.4	S. ...	.763	78.4	77.6	76.3	W	.758	77.4	77.8	76.8	E. .. .	1.60	1.64
10		.825	84.3	85.4	81.4	S. .	.785	87.5	88.6	83.6	Ditto ..	.680	87.8	87.6	81.6	S.	.759	79.9	77.4	75.8	W ..	2.44	2.50
11		.824	83.2	85.0	82.3	S. W. .	.762	87.0	89.2	83.2	S. W. ...	.699	86.3	83.2	80.0	Ditto	.729	82.3	82.8	81.3	S. E .	0.56	0.58
12S		.829	83.4	84.6	81.7	S. S. E.	.789	86.0	87.7	82.3	S. E ..	.696	81.9	80.5	78.7	N. N. W.	.706	81.3	81.3	79.8	Ditto. .	0.16	0.17
13		.812	84.0	85.5	81.6	E ..	.763	86.0	87.8	82.5	Ditto. .	.660	86.5	86.6	82.3	S. S. E.	.670	86.4	85.8	81.6	S.	2.22	2.29
14	●	.765	85.4	86.8	80.5	Ditto.	.722	88.0	89.0	81.2	E. S. E.	.636	88.0	88.6	82.0	S. W	.649	86.0	84.4	81.4	E. ..	.	.
15		.770	85.6	86.8	81.1	E. S. E.	.730	88.0	89.2	81.6	S. E ...	.648	89.0	89.2	82.4	N. E ..	.653	87.0	86.4	81.4	S.	0.19	0.20
16		.742	85.7	87.5	81.5	E.	.693	88.4	[illegible]	82.6	E. ...	.606	85.4	84.7	82.3	E. S. E	.612	86.0	85.4	82.3	S. S. W.	...	
17		.675	86.0	87.3	81.7	Ditto .	.646	89.0	90.5	82.6	Ditto. ...	.553	90.3	90.3	83.0	E .	.554	85.5	84.8	80.3	E	0.42	0.45
18		.559	86.4	88.2	83.6	N.	.522	89.0	90.3	84.6	N. W ...	.422	90.0	90.6	83.4	N. E. .	.429	88.0	83.2	79.3	N. E. .	.	.
19S		.472	80.0	79.9	78.9	S. S. W.	.433	80.5	80.5	79.4	W. ..	.354	82.5	83.8	81.4	S. S. W.	.368	82.2	81.4	79.4	E. S. E	3.47	3.51
20	☾	.589	79.6	80.2	79.0	S. W.	.564	80.6	81.4	79.7	S. W. ..	.580	81.6	81.4	80.0	S. W.	.599	81.0	81.3	80.0	S.	3.63	3.98
21		.750	85.2	86.3	82.6	S. S. W.	.721	88.3	89.4	84.3	S. S. W.	.642	90.3	90.9	84.4	S. .	.674	88.0	87.2	83.4	Ditto. ..	0.10	0.10
22		.761	85.8	87.2	82.8	E. S. E.	.712	88.3	89.7	82.2	S. E ..	.602	90.5	90.7	83.3	N. N. E.	.630	83.6	83.2	79.8	S. S. E.	..	.
23		.728	85.6	87.2	81.6	E. N. E.	.664	88.3	90.4	83.3	N. E. ..	.578	86.2	86.2	82.4	E. .	.615	84.8	84.4	80.6	N. E ..	...	...
24		.750	85.0	86.3	81.4	Ditto.	.716	87.8	89.0	81.6	E. N. E.	.647	80.2	80.4	79.0	Ditto	.675	80.2	80.3	78.4	E. ..	.	.
25		.769	83.7	85.3	80.6	Ditto.	.731	84.4	85.2	81.7	N. N. E.	.658	80.6	80.7	78.5	E. N. E	.696	80.6	81.2	79.0	N. E. ..	0.64	0.86
26S.		.798	83.4	84.2	81.3	E. S. E	.769	84.6	84.6	81.3	E. ..	.689	85.5	84.7	81.4	S. E. .	.707	83.0	83.0	79.6	S. E. .	0.27	0.29
27		.834	85.3	86.5	81.6	S. .	.790	88.0	89.0	82.0	S. ..	.709	89.0	89.5	81.0	S.	.718	86.8	86.2	81.3	S. ..	..	...
28	☉	.815	85.3	86.4	80.6	S. S. E.	.774	88.0	89.2	81.6	Ditto. ...	.687	88.4	88.2	81.3	Ditto. .	.699	86.8	86.0	81.2	Ditto. ...	...	...
29		.820	86.0	87.3	81.4	S. E. .	.783	88.3	89.0	83.4	Ditto. ..	.725	87.6	85.3	82.4	Ditto ...	.747	85.8	85.0	80.9	Ditto. ...	..	...
30		.874	83.1	83.8	81.4	S. .	.837	84.3	86.6	83.3	S. W. ..	.762	88.0	87.4	83.0	Ditto ..	.775	86.2	85.6	82.6	Ditto. ..	0.47	0.51
ean,		29.747	84.3	85.5	81.5		29.711	86.6	87.8	82.2		29.631	86.4	86.4	81.5		29.650	84.3	83.7	80.5		19.66	20.41
he ng ast ...		29.714	86.0	87.0	81.9	140 2	29.678	88.3	88.9	82.2		29.601	88.6	88.2	81.7		29.623	86.1	85.6	81.3		7.5	[illegible]

hese Observations have been made, for the most part, with a supply of new and first-rate Instruments, receivd
ıe Observatory, by orders of the Bengal Government. A brief description of the Instruments seems necessary.

Days of the Month.	Moon's Phases.	Observations made at 10 A. M.					Observations made at Apparent Noon.					Observations made at 4 P. M.					Observations made at 6 P. M. from 1st till 21st, and at 5 P. M. from 22nd till 30th.					Rain Gauges.	
		Barometer reduced to 32° Fahrenheit.	Temperature.			Wind.	Barometer reduced to 32° Fahrenheit.	Temperature.			Wind.	Barometer reduced to 32 Fahrenheit.	Temperature.			Wind.	Barometer reduced to 32° Fahrenheit.	Temperature			Wind.	Elevation.	
																						Feet. 60.	Feet. 5.
			Of the Mercury.	Of the Air.	Of Wet Bulb.	Direction at 10 A. M.		Of the Mercury.	Of the Air.	Of Wet Bulb	Direction at Noon.		Of the Mercury.	Of the Air.	Of Wet Bulb.	Direction at 4 p. m		Of the Mercury.	Of the Air.	Of Wet Bulb	Direction at sunset.	Upper	Lower.
		Inches	o	o	o		Inches.	o	o	o		Inches.	o	o	o		Inches	o	o	o		Inches	Inches
1		29.842	85.4	87.0	81.6	S. W. ..	29.801	87.6	89.0	81.4	S. W. ..	29.737	88.9	90.4	81.3	S. W. ...	29.739	87.5	87.0	81.0	S. .	..	...
2		.828	86.0	86.8	80.4	W. S. W.	.794	87.8	89.2	80.0	W. ...	.722	90.0	90.6	79.6	W. ...	.725	87.8	87.4	80.0	W	..	...
3S		..	...	..	...	.. ..	..	.	..	...	...	...	...	.	..	.. .	.	.		.	. .	..	...
4		.916	84.8	86.2	78.6	W. S. W.	.879	87.4	88.7	80.0	Ditto. ..	.802	89.5	89.8	79.6	W. .	.808	87.0	86.4	79.4	W. S. W.	...	...
5		.952	83.6	85.2	77.3	N. W. .	.910	86.6	88.4	78.6	N. W. .	.845	89.5	90.4	79.6	N. W. .	.851	88.8	88.6	79.0	W. .	..	...
6	☽	.977	85.5	87.8	79.6	N. N. E.	.923	88.5	89.7	79.3	N. N. E.	.850	88.6	89.0	80.0	N. E. .	.873	88.0	87.6	80.0	S .	...	...
7		.963	86.3	88.1	79.8	N. E. .	.912	89.4	90.5	79.7	E. N. E.	.807	89.8	90.5	79.7	N. .	.827	88.1	88.0	79.9	N. E .	...	...
8		.950	86.7	88.3	81.6	N.	.889	89.7	91.2	82.2	N. E. ..	.796	90.0	91.0	80.5	N. E. .	.823	88.3	88.0	81.0	E. .	...	..
9		.947	87.0	88.5	80.0	N. N. E.	.905	89.0	90.4	79.7	Ditto .	.824	90.0	90.5	79.8	N. N. E	.837	88.0	88.0	80.2	Ditto. .	...	...
10S		...	..	.	...	.. ..	.	..	...	..	...	..	..	..	...	.	.			...	. ...	...	...
11		.956	86.0	87.3	81.3	N. N. W.	.905	87.0	88.6	81.0	S. S. W.	.825	90.3	91.4	81.0	S. W. .	.843	88.2	87.4	79.5	N. E. .	...	...
12		.923	85.5	86.6	80.2	W. ..	.866	86.8	88.4	80.6	W. N. W.	.783	89.6	90.7	80.8	W. S. W.	.746	87.0	86.0	81.0	E. S. E	..	...
13	●	.887	85.6	87.0	80.8	S. S. W.	.845	88.0	88.8	80.6	Ditto. ..	.770	90.5	91.5	81.5	S. W. ..	.768	88.0	88.2	81.3	S. S. E.	..	...
14		.869	86.5	88.3	82.2	S. W. .	.829	88.0	89.5	81.0	W. .	.738	87.8	88.7	80.3	E. N. E.	.745	87.7	87.6	81.3	S. S. W.	..	...
15		.858	85.3	86.0	81.7	E. ..	.817	87.4	88.4	81.6	W. S. W.	.737	85.3	86.6	81.5	S. E. ..	.741	84.8	84.8	81.0	S. E.	1.11	1.17
16		.847	84.3	86.4	79.4	N. ..	.798	87.5	89.0	78.1	N. N. W.	.741	90.0	90.5	76.4	N. N. W.	.760	86.3	85.6	77.2	N. W. ..	..	...
17S.		...	..	..	...	.. .	.	...	..	..	.. ...	..	..	.	.	... .	.	.	.			...	...
18		.940	83.7	85.4	78.1	W. S. W.	.868	87.0	89.0	78.7	S. W. ..	.823	89.5	89.8	77.7	S. S. W.	.838	86.0	85.4	78.2	S .	..	...
19		.960	84.1	85.6	78.1	S. W. .	.916	86.8	88.5	78.1	Ditto. .	.852	89.1	89.1	76.2	S. W. ..	.862	86.0	85.2	76.0	S. W.	.	...
20	☾	.972	83.2	85.0	77.0	S. S. W.	.924	86.0	88.0	76.2	S. S. W.	.850	88.9	89.0	75.0	W ..	.874	85.8	85.3	75.6	S. S. W.	..	...
21		.993	82.9	84.5	75.8	E. ..	.947	85.6	87.0	74.9	E .	.879	88.0	88.0	72.5	N. E.	.893	85.0	84.4	76.4	Calm. .		...
22		30.010	83.4	85.3	75.4	N. E. ..	.947	87.2	89.0	77.8	N. N. E.	.900	85.6	81.5	75.8	blowing*	.913	79.8	76.6	73.9	N. E. .	0.78	0.81
23		.016	81.5	83.2	78.1	E. ..	.950	84.3	85.0	76.1	E. ..	.891	80.7	80.7	72.8	S. S. W.	.904	80.0	80.3	77.2	S. ..	0.22	0.24
24S.		...	..	...	..	.. ..	..	.	.	..	.. .	...	.	.		..		.		.	... ..	.	.
25		.020	80.5	81.0	78.9	E. S. E.	.953	82.0	83.1	78.9	E. S. E.	.896	80.0	78.8	75.9	N. .	.907	79.9	78.0	76.0	W. ..	0.36	0.37
26		29.958	79.3	81.0	78.0	E. ..	.897	83.5	84.9	79.8	S. E. .	.809	83.6	82.6	78.4	S. ..	.815	82.8	82.3	77.8	S. S. E.	..	...
27		.925	78.2	79.2	76.6	N. W. ..	.877	81.0	82.7	77.9	N. W. ..	.817	85.6	85.0	79.3	N. N. W.	.838	84.0	83.5	78.8	N. ..	...	...
28	⊙	30.004	82.2	83.5	78.0	N. N. E.	.959	89.3	89.8	78.8	N. E. ..	.925	86.2	85.8	77.3	N. ..	.936	85.6	85.0	77.3	Ditto ...	..	...
29		.061	81.8	83.5	77.1	E. N. E.	30.007	84.0	85.5	75.9	N.	.941	87.1	87.3	75.8	N. ..	.944	85.9	85.3	74.8	N. N. W.	...	...
30		.032	80.4	82.2	75.0	S. S. W.	29.991	83.4	85.3	75.0	W. S. W.	.923	86.4	86.4	73.4	W. ..	.939	85.6	85.3	73.7	N. W. ..	...	...
31S.		..	..	..	..	.. ..	..	..	..	..	.. ..	..	..	..	..	.. ..	..	..	..	..	.. ..	..	..
Mean,		29.946	83.8	85.4	78.9		29.897	86.6	88.0	79.0		29.827	87.7	87.9	76.1		29.838	85.8	85.3	76.4		2.47	2.59
the							[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	84.5	78.5	* Gently	29.768	83.4	[illegible]	[illegible]			16.25

These Observations have been made, for the most part, with a supply of new and first-rate Instruments, recei the Observatory, by orders of the Bengal Government. A brief description of the Instruments seems necessary.

Barometer by Troughton used prior to the 1st June, 1844. Observations reduced to 32° Fah. = 29.493

Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of November, 1852.

Days of the Month.	Moon's Phases.	Observations made at 10 A. M.					Observations made at Apparent Noon					Observations made at 4 P. M.					Observations made at 5 P. M.					Rain Gauges.	
			Temperature			Wind.		Temperature			Wind		Temperature.			Wind.		Temperature.			Wind.	Elevation.	
		Barometer reduced to 32° Fahrenheit.	Of the Mercury.	Of the Air.	Of Wet Bulb	Direction at 10 A. M.	Barometer reduced to 32° Fahrenheit.	Of the Mercury.	Of the Air	Of Wet Bulb	Direction at Noon.	Barometer reduced to 32° Fahrenheit	Of the Mercury	Of the Air.	Of Wet Bulb	Direction at 4 P. M.	Barometer reduced to 32° Fahrenheit.	Of the Mercury.	Of the Air.	Of Wet Bulb	Direction at Sunset.	Feet. 60 Upper	Feet. 5. Lower
		Inches	o	o	o		Inches.	o	o	o		Inches.	o	o	o		Inches	o	o	o		Inches	Inches
1		30.029	79.1	81.7	71.7	W. N. W.	29.980	82.5	84.5	71.5	W. S. W.	29.921	85.0	85.0	71.0	S W ...	29.924	83.8	83.0	71.6	S. W.	..	.
2		023	76.9	79.0	68.1	N. N. W.	.977	80.9	83.5	68.5	do ...	.917	84.2	84.2	69.0	N N. W.	.926	83.1	82.9	71.0	N N W	..	
3		.066	77.4	79.4	69.6	W ..	30.019	81.0	83.0	70.8	W. ...	.947	83.4	83.3	70.2	W. N W.	.954	82.2	81.4	69.8	W. ..	...	..
4		.069	78.0	80.5	69.8	S. ..	015	81.3	82.7	70.4	N. W. .	952	83.3	83.0	69.6	N W. ..	.964	82.0	82.0	71.0	N. W. .	..	.
5	☾	.062	76.6	78.7	69.9	W. ..	.002	80.1	82.2	70.5	W. ..	914	82.9	82.8	71.0	do ...	.928	81.6	81.3	71.1	W .	..	..
6		.056	77.4	79.7	70.5	N. N. E.	.003	80.9	82.1	71.5	N. ..	.948	82.9	82.8	70.6	do. ...	.956	81.8	81.6	71.0	N W .	.	..
7S																							
8		.077	76.0	77.5	72.2	N. ...	.022	77.0	78.0	72.8	N. W ...	.968	77.0	77.2	71.7	N. ...	.971	76.6	76.8	72.2	W. ..	.	
9		041	76.3	78.4	72.8	do. .	29.986	80.2	82.0	74.2	do. ..	.915	82.6	83.5	72.1	do. .	923	81.6	81.6	72.8	N. ...	.	..
10		.022	79.0	81.0	74.6	N. W. ..	.977	82.0	83.6	74.7	do. ..	896	84.8	84.2	73.8	N. W. ...	.903	83.2	82.9	73.3	N. W. .	.	.
11	●	019	77.0	79.2	71.0	N N E	.976	81.7	84.2	73.3	N. ..	.911	84.0	83.4	71.4	do, .	927	82.5	82.2	72.4	do. ..	..	...
12		043	77.2	79.0	70.3	N .	.975	82.0	84.5	71.4	N. W.	.902	83.5	83.3	68.7	do.	.907	81.8	81.4	69.0	do	.	..
13		.005	76.2	79.0	69.4	N. W. .	.946	81.0	83.0	70.0	W. N. W.	.852	83.0	82.3	68.0	W. N. W.	858	81.0	80.7	68.7	N. N. W.	..	..
14S																							
15		.015	75.0	77.2	71.2	N. W.	.964	79.4	82.0	70.3	N. ..	.900	81.8	81.8	70.4	N. W.	.907	80.6	80.6	70.0	N. W. .	..	.
16		004	76.4	78.8	70.2	N. ..	955	79.7	82.2	70.8	N. W. .	.891	82.0	81.4	69.9	W. N W.	.897	80.5	80.0	70.1	Calm. ...	..	..
17		29.995	74.8	77.1	70.6	W. N. W.	.928	79.0	81.0	70.1	W N W.	.852	81.6	81.5	69.0	N. W. ..	.850	80.0	79.4	71.0	N W .	...	.
18	☽	.958	75.7	77.7	70.2	W	.905	78.9	80.9	70.6	W. ..	.850	81.5	81.5	69.9	do. ..	.866	80.2	79.9	69.8	do. ..	..	..
19		.938	75.9	78.6	71.0	S ..	877	80.4	83.0	73.2	S. S. W	.795	84.0	83.8	74.6	S ..	.805	82.2	80.6	73.8	S. ...	...	...
20		.942	75.7	78.0	71.1	W. N. W	896	80.2	82.6	69.7	N. W. ...	.829	82.4	82.2	66.2	W. ...	.841	80.8	80.0	68.5	Calm. .	...	..
21S.																							
22		30.068	73.0	75.9	66.8	N ..	30.019	76.5	78.7	66.5	W ..	937	79.4	79.1	67.0	N. W. ...	.947	78.0	77.9	67.2	N. W. .	...	...
23		.076	72.3	75.0	65.7	N. W. .	.024	76.5	79.0	67.4	N. W. ..	.931	79.4	79.2	67.8	do. ..	935	78.2	77.7	67.9	do. ...	...	...
24		.062	71.6	73.8	67.2	W N W.	010	75.9	78.4	69.2	W. ..	.918	79.2	79.5	67.5	Calm. ..	.927	78.0	77.7	67.7	Calm. ...	...	...
25		.093	72.6	75.7	68.0	N. W. .	.057	77.3	79.3	67.5	W. N W.	.985	78.8	78.7	66.9	N. W. .	.999	77.2	76.7	67.0	N. .	...	...
26		.155	73.0	76.0	68.5	N N W	.108	76.5	79.8	68.9	N. ..	30.019	78.9	78.8	67.6	do. ..	30.021	77.2	77.0	68.0	N. W. .	...	...
27	⊙	.090	71.9	74.5	67.5	N. W. .	.025	76.4	78.6	69.3	N. W.	29.929	79.0	79.0	69.2	N. N W	29.937	78.0	77.6	68.9	N. N. W	...	..
28S.																							
29		.030	72.5	75.0	68.0	N. N. W.	29.987	75.9	77.4	68.5	N. N W.	.908	77.0	77.4	68.8	N. N. W.	.906	76.5	76.4	68.3	do. ..	...	...
30		.035	71.3	73.3	64.2	N. W. .	.993	76.0	78.7	63.5	N. W. ...	910	79.0	79.2	63.9	N. W. ..	.925	77.5	77.4	65.6	Calm. .	...	..
			-	77.7	69.6		29.986	79.2	81.4	70.2		29.911	81.6	81.5	69.5		29.919	80.3	79.9	69.9		..	...

These Observations have been made, for the most part, with a supply of new and first-rate Instruments, received of the Bengal Government. A brief description of the Instruments seems necessary.

Moon's Phases.	Observations made at 9 H. 50 M.					Observations made at Apparent Noon.					Observations made at 4 P M					Observations made at Sunset					Rain Gauges	
	Barometer reduced to 32 Fahrenheit.	Temperature			Wind.	Barometer reduced to 32 Fahrenheit.	Temperature.			Wind	Barometer reduced to 32 Fahrenheit.	Temperature			Wind.	Barometer reduced to 32 Fahrenheit.	Temperature			Wind	Elevation	
		Of the Mercury.	Of the Air.	Of Wet Bulb.	Direction at 9 h 50 m		Of the Mercury.	Of the Air.	Of Wet Bulb.	Direction at Noon.		Of the Mercury.	Of the Air.	Of Wet Bulb	Direction at 4 p m.		Of the Mercury.	Of the Air	Of Wet Bulb	Direction at Sunset.	Feet 60. Upper.	Feet 5. Lower
	Inches.	o	o	o		Inches.	o	o	o		Inches.	o	o	o		Inches.	o	o	o		Inches	Inches
	30.090	68 6	70 3	60.7	W N.W	30 042	74 0	77.1	64.7	N. ...	29.964	77 0	77 0	63 8	N. W. .	29.977	75.9	75.8	64.8	N. W. .	.	...
	.078	68.8	71 0	61.0	N. W ..	.037	73.9	77.0	64.2	do. ...	.955	76 7	76 8	65 5	W.N W	.962	75.7	75·0	66.0	W. ..	...	...
	.087	66 5	68.5	58 0	N.N W.	.037	70.4	72 0	61.1	N. N.W.	960	71 8	72.0	63.5	N.N W.	.971	71.3	71.2	64.0	N. W ...	...	...
☾	.118	69 0	72.0	64.0	do. .	069	73.4	76.0	65.8	do. ..	.978	76.9	76.4	65.6	do. .	.992	75.5	75.2	66 3	N. ..	...	..
	.120	70.7	73 4	65.7	N.	056	75 3	78.0	67.8	N. .	.961	78 5	78 3	66.3	do. ..	961	76.8	76 1	66.7	N. N.W	...	...
	.086	71.0	74.5	66.0	N.N. W.	.038	75 0	78 0	66.8	W.N. W.	.966	78 2	78.2	66 6	N. W.	.974	76.9	76.4	67.9	N. W .	...	...
	.054	71.6	74.3	68.0	N. W. ..	29.991	76 8	78.0	68 0	W. .	.912	78 7	78 8	69 0	W. S W	.918	77 0	76 4	69 9	W S. W	...	...
	.030	72.3	75 3	72.2	S. S. W.	974	77 2	80 0	71.4	S. S W.	.904	79.3	80 3	72.4	S S. W	.918	78.4	78.5	72.8	S. S. W.	0.27	0.26
	.027	71.0	71.4	68.0	N. ..	996	71.4	71.9	68.2	N.N. W.	.943	70.6	69 4	67.4	N .	.960	66.6	68 3	66.4	N. ..	0 17	0.24
●	.050	69 4	70.8	68 4	do. .. .	30.005	72.2	73 4	69.2	do. ...	.944	74.0	74 2	68.8	do. .	956	73 2	72·8	68 7	do. ..	...	...
	.110	68.0	70.2	69 0	N N. W.	.070	73.0	75 6	67.9	N. ..	30.004	75 6	75 0	65.8	N. N. W.	30 018	73.6	72·8	66.0	N. N.W	...	...
	.150	67.8	70.6	62 6	do ..	093	72 0	73.8	63.0	N N.W.s	.015	74.3	74.0	62 9	do s	022	72.4	71 7	64.0	do. ...	..	...
	.083	66 4	69.0	61.6	do ...	.032	72.4	75 6	65 6	N,N. W.	29.951	76.0	76 0	64.4	N sharp,	29.964	74.0	73·6	64.6	do. ...	..	...
	.087	67.6	70 6	63.6	do. ..	.037	73 3	75.6	65.8	do. ..	967	76.4	76 4	65.8	N. W .	.976	74 6	74 2	66.0	N W. ..	...	...
	.121	67 7	70.1	64.6	N. W. .	.068	73 1	76 4	67 6	N. W. .	.985	76.6	76·6	65 4	do	.985	74.7	74.2	65.4	do ..	..	...
	.120	66.1	68.7	60 6	N.N. W.	.084	72.2	75.0	68.3	N.N. W.	30 009	74 5	74.2	60 2	N.N. W.	30.017	72.4	71.6	62.4	do. ..	..	...
☽	.126	63.0	66.0	56.2	N. W.	.060	69.5	72.3	61 8	N. W. ...	29.961	74.2	74.2	63 8	N W	29.968	72 4	71.8	65 0	do ..	..	.
	.102	67.8	70 2	64.2	N.	.049	72 6	75 6	66.2	N. ...	.964	75 2	75 5	65.1	do	967	73.6	72 8	64.8	N .	...	..
	.112	67 8	70 9	65 2	do. ..	056	72.6	75 4	66 2	do. ...	.991	75.9	75.6	65 4	do.	.996	74 0	73 5	66 7	N. W .	...	...
	.133	68 9	71 9	65 8	N N W.	.081	74 1	76.9	67.6	N. W. ..	.995	76.6	76.6	67 0	W. .	30 015	74 8	74 2	67 8	W. ...	.	..
	.134	67·7	71.0	62 0	do. .	.071	73 4	76 3	64 0	N. N. W.	.983	75.6	75 0	62 6	N. N.W	29 989	73.4	72 4	63 0	N. N W.	...	...
	.072	66.1	68.3	61.4	do .	.004	71 4	74.3	62.2	N. ..	.920	74 2	73 8	61 4	N. W	920	72.3	71.4	62 3	W N.W	.	..
	.052	64.7	67·1	58.4	N W. ..	005	70.0	72.0	60.0	N. W . .	.949	72 4	72.0	58.3	do.	956	70 4	69.3	59 6	N. W.	...	...
	.121	63.7	67.4	59 4	do. .	.080	69.4	71 4	60.6	do ..	30.013	71.8	71 4	59.4	N N W.	30.025	70.0	69 2	60 2	N. N.W.	..	..
⊙	185	63.7	66 8	59 4	N.	.080	70.0	72.4	62 0	N. N. W.	29.996	72.3	72 3	60 0	N. W .	.005	70.6	69 6	60 8	N. W.	..	. .
	175	63 7	66 9	57 8	N. N W.	114	69.6	71.6	60 7	do ..	30.019	73.4	73 0	61 4	N	.011	71.4	70 7	61.2	N.N. W.	..	...
	.104	61.2	63.2	57 4	do. .	.046	67.4	69.6	61 0	N. W. .	29.952	72 0	72.3	62 4	do.	29.962	70.0	69.0	62 7	N. W. ..	...	.
	.077	62.6	65.3	59 6	N .	.028	68.4	70 7	62.0	N N. W.	.971	72 2	72 2	62·7	N. N W.	986	70 4	69·6	62.4	do. ...	..	...
	.121	62 2	65.1	59.8	do. ...	.088	68.0	70.6	62.0	do. ..	30.000	73.3	73.3	62.3	do. ..	997	71.4	70 3	62 4	N.N. W.	...	...
	.169	64.6	68.4	59.7	do ..	.107	71.5	75 0	62.3	N. ...	.007	76.4	76 8	61 6	N.	30 009	72.4	71.4	62.8	N. W...	..	...
	30 102	67.0	69.6	62.7		30 050	72.1	74.6	64.6		29.971	75.0	74 9	64.2		29.979	73.3	72 6	64.8		0 44	0.50
	30 091	67.2	69.8	62.5		30.032	73.2	75.3	64.1		29.958	76.1	75.5	63.5		29.969	73.7	72.4	64 6		...	...

These Observations have been made, for the most part, with a supply of new and first-rate Instruments, re
into the Observatory, by orders of the Bengal Government. A brief description of the Instruments seems necessary

Barometer by Troughton, used prior to the 1st June, 1844. Observations reduced to 32° Fah = 29.493
" by Col. Everest, used from 1st June to 31st August, 1844. ... Ditto .. = 29.637

LIST OF MEMBERS

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Agricultural & Horticultural Society

OF

INDIA.

DECEMBER 31*st*, 1852.

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AND

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Dubus, E. E., Esq. Indigo planter, Coolbareah,	1847
Duff, Wm., Esq. Indigo planter, Bhaugulpore,	1847
Dukhinaranjun Mookerjee, Baboo, Calcutta.	1848
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Elliot, J. B., Esq. Civil service, Patna,	1851
Elliot, J. Scott, Esq. Merchant, Calcutta,	1851
Elliott, W. Henry, Esq. Civil service, Calcutta,	1839
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Eyre, Capt. Vincent, (Artillery) Gwalior Contingent, Augur,	1851
Faddy, Capt. S. B., (36th N. I.) Executive Officer, Goordaspore.	1851
Falconer, H., Esq. M.D. and A.M., Medical service, Supdt. H. C. Botanic Garden, Calcutta,	1839
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Fergusson, William Fairlie, Esq. Merchant, Calcutta,	1837
Fergusson, J. H., Esq. Merchant, Calcutta,	1851
Ferris, Major Joseph, C.B., (20th N. I.) Commandant 2nd Regiment Seik Infantry, Kangra,	1846
Finch, Justin, Esq. Indigo planter, Tirhoot,	1852
Firminger, Rev. T. A. C., Chaplain, Ferozepore,	1851
Fitzgerald, Lt.-Col. James, (42d Madras N. I.) Jubbulpore,	1852
Forlong, James, Esq. Indigo planter, Mulnaut, viâ Bongong,	1850
Fraser, Major Hugh, (Bengal Engineers) Burmah,	1850
French, Henry G., Esq. Indigo planter, Meergunge, viâ Mahomedpore,	1839
French, Gilson R., Esq. Indigo planter, Jessore,	1841
French, G. E., Esq. Indigo planter, Meergunge, viâ Mahomedpore,	1847
Frith, R. W. G., Esq. Indigo planter, Jessore,	1843
Fytche, Lieut. A., (70th Regiment N. I.) Assistant Commissioner of Arracan, Sandoway,	1849
Garrett, Robert Birch, Esq. Civil service, Purneah,	1837
Garstin, Charles, Esq. Civil service, Sarun,	1838
Garstin, Lieut.-Colonel Edward, (Engineers) Calcutta,	1834
Gasper, G. M., Esq. Merchant, Calcutta,	1846
Gerrard, Major John Grant, Sub-Asst. Commy.-Genl., Hissar,	1838
Gifford, John, Esq. Merchant, Calcutta,	1846
Gilbert, Major General Sir W. R., K.C.B., (Bengal Fusileers) Member of the Supreme Council of India, Calcutta,	1851
Gill, Capt. Robert, (44th Madras N. I.) Jaulna,	1851
Gilmore, M. S., Esq. Civil service, Cuttack,	1844
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Gladstone,† Adam S., Esq. Merchant,	1840
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Gobindchunder Dutt, Baboo, Merchant, Calcutta,	1851
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Grant, Archibald, Esq. Attorney, Supreme Court, Calcutta,	1835
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Gubbins, M. R., Esq. Civil service, Agra,	1842
Guise, Captain Henry J., (28th Regt. N. I.) Peshawur,	1844
Guise, R. C., Esq. Medical service, Meerut,	1850
Gulliver, Lieut. H. W., (Bengal Engineers) Ferozepore,	1851
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Hamilton, H. C., Esq. Civil service, Tumlook,	1851
Hammill,† William, Esq. Merchant,	1844
Hampton, Brigadier George, (Nizam's Army) Hydrabad,	1852
Handscomb, Lt.-Col. Isaac, (40th Light Infantry) Burmah,	1846
Hankin, Lieut. G. C., (Adjt. 6th Irr. Cavalry) Sealkote,	1851
Hannay, Major Simon Fraser, (40th Regiment N. I.) Commanding Assam Light Infantry, Jeypore,	1837
Hannyngton, Major John C., (24th Regiment N. I.) Deputy Commissioner, Chota Nagpore,	1837
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Harwood, W. L., Esq. Clerk to the Police Magistrates, Calcutta,	1851
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Hayes, Captain Fletcher, Political Asst. Resident, Lucknow,	1852
Hayton, John, Esq. Sugar manufacturer, Trehmonee, Jessore,	1852
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Hewett, G., Esq. Deputy Magistrate, Cutwah,	1848
Higgins, Lieut. G. E., (3rd Regt. N. I.) Jheelum,	1851
Higgins, Geo., Esq. Solicitor, Supreme Court, Calcutta,	1851
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Hill, James, Esq. Merchant, Calcutta,	1842
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Hill, Joseph, Esq. ditto, ditto,	1850
Hill, Geo., Esq. Acct.-General's Office, Calcutta,	1851
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Hodgson, Brian Haughton, Esq. Darjeeling,	1839
Hodgson, R. F., Esq. Civil service, Gya,	1847
Hogge, Major Charles, (Artillery) Dum-Dum,	1840
Hollings, Charles, Esq. Sub-Depy. Opium Agent, Gya,	1841
Hollings, Capt. G. E., (38th N.I.) Depy. Commr. Leia, Punjab,	1843
Holroyd, Lieut. Chas., Asst. Commissioner, Assam, Gowhatti,	1849
Horee Mohun Sen, Baboo, Calcutta, (Vice-President)	1837
Houghton, Major R., (63rd Regt. N. I.) Wuzeerabad,	1847
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Huthwaite, Lt.-Col. Edward, C. B., (Horse Arty.) Loodianah,	1841
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Jackson, L. S., Esq. Civil service, Monghyr,	1852
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James, Capt. Hugh R., Depy. Commr. Punjab, Peshawur,	1846
Jardine, David, Esq. Merchant, Calcutta,	1852
Jenkins, Lieut. H. G., (10th Light Cavalry) Kurturpore,	1852
Jennings, C. R., Esq. Indigo planter, Surdah,	1848
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Johnson, John, Esq. Merchant, Calcutta,	1849
Johnston, Brigadier J., Commanding Hingolee Division,	1850
Johnstone,† John, Esq. Merchant,	1849
Johnstone, Lieut. H. C., (Bengal Engineers) Sealkote,	1852
Joykissen Mookerjea, Baboo, Zemindar, Hooghly,	1852
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Kinleside, Major R. R., (Artillery) Jullundur,	1847
Kistomohun Chowdry, Baboo, Zemindar, Guttaul,	1851
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Lamb, Capt. Wm., (51st Regt. N. I.) Lucknow,	1847
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Lautour, Edward, Esq. Civil service, Arrah,	1851
Lawrence, Lieut-Colonel Sir H. M., K.C.B., Lahore,	1840
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Loch, George, Esq. Civil service, Berhampore,	1852
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McDonald, D., Esq. Merchant, Calcutta,	1852
McDonell, E., Esq. Sub-Deputy Opium Agent, Chumparun, Tirhoot,	1842
McLeod, Donald Frield, Esq. Civil service, Commissioner Trans-Sutledge States,	1836
McLeod, C., Esq. Register, Political Dept., Calcutta,	1848
Macdonald, A. G., Esq. Civil service, Malda,	1852
Mackenzie, James J., Esq. Merchant, Calcutta,	1842
Mackenzie, H., Esq. Indigo planter, Jingergatchie, Jessore,	1850
Mackenzie, Lt.-Col. J., (8th Lt. Cavalry) Commg. 6th Irr. Cavalry, Sealkote,	1851
Mackenzie, Brigr. Colin, (Madras Army) Commg. Ellichpore Division,	1851
Mackinlay, D., Esq. Merchant, Calcutta,	1851
Mackintosh, George G., Esq. Civil service, Calcutta,	1838
Mackintosh, Eneas, Esq. Indigo planter, Purneah,	1849
Mackintosh, A. B., Esq. Solicitor, Calcutta,	1850
Maclagan,* Frederick, Esq. Indigo planter, Kishnaghur,	1837
Macleod, B. W., Esq. Medical service, Agra,	1849
Macnair, George, Esq. Indigo planter, Babookally factory, Jessore,	1851
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Mactier, T. B., Esq. Civil service, Furreedpore,	1846
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Maharajah Shreeschunder Roy, Bahadoor, Nuddea,	1851
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Malchus, G., Esq. Calcutta,	1852
Malet,† O. W., Esq. Civil service,	1846
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Marks,† C. H., Esq. Merchant,	1848
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Marriott, Major E., Pension Pay Master, Lucknow,	1852
Marshman, J. C., Esq. Editor of the *Friend of India*, Serampore,	1829
Martin, Major T., Offg. Presy. Pay Master, Calcutta,	1852
Mason, Lieut. G. H. Monck, Political Agent, Kerowly,	1851
Masters,* J. W., Esq. Asst. to Commr. of Assam, Nowgong,	1835
Mathews, A. H., Esq. Agent, Simla Bank, Simla,	1848
Mathie,* Lt.-Col. James, (33rd Regt. N. I.) Deputy Commissioner of Assam, Gowhatti,	1836
Maxwell, Lieut. J. Harly, (Bengal Engineers) Sealkote,	1851

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Mayne,† Major H. O., (Nizam's Army)	1851
Meik,† Captain Alexander, (H. M. 94th Regiment,)	1848
Meik, J. P., Esq. Architect, Calcutta,	1852
Mercer, G. G., Esq. Indigo planter, Eta,	1846
Mills,* Andrew John Moffat, Esq. Civil service, Calcutta,	1836
Molloy, R., Esq. Attorney, Supreme Court, Calcutta,	1842
Monckton, H., Esq. Civil service, Punjab,	1847
Monckton, E. H. C., Esq. Civil service, Humeerpore,	1851
Money,* William James Henry, Esq. Civil service, Calcutta,	1836
Money, David Inglis, Esq. Civil service, Berhampore,	1839
Morgan, R. B., Esq. Civil service, Delhi,	1852
Mornay, H., Esq. Secretary Assam Company, Calcutta,	1843
Mornay, Stephen, Esq. Supdt. Assam Tea Co.'s Plantations,	1851
Morton, C. E., Esq. Indigo planter, Malda,	1848
Morton, T. C., Esq. Barrister, Supreme Court, Calcutta,	1840
Morton, Lieutenant William Elliot, (Bengal Engineers) Supdt. of Canals, East of the Jumna,	1851
Moses, Owen, Esq. Calcutta,	1851
Muir, W., Esq. Civil service, Agra,	1850
Muspratt, J. R., Esq. Civil service, Chittagong,	1847
Mutteelal Seal,* Baboo, Merchant, Calcutta,	1835

NAESMYTH, J., Esq. Civil service, Punjab,	1852
Neame, A. C., Esq. Inspector of Customs, Calcutta,	1851
Nicholetts, Capt. W. H., Comg. Oude Local Infy., Seetapore,	1851
Nicol, F. A. M., Esq. Sugar Manufacturer, Dhoba,	1851
Nobokoomar Mullick, Baboo, Calcutta,	1852
Nurrender Kissen, Bahadoor, Rajah, Deputy Magistrate, Midnapore,	1851

O'BRIEN, Captain Wm., (8th Regiment Nizam's Infantry) Aurungabad,	1846
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Ouseley, Major R., (50th Regiment N. I.) Delhi,	1845
Owen, Capt. W. G., (11th Regiment Madras N. I.) Nursapatam, near Payakerowpett,	1846
Owen, J. C., Esq. Pilot service, Calcutta,	1847

PALMER, Brigadier Thomas, (72nd Regt. N. I.) Delhi,	1843
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Palmer,† John Carrington, Esq. Merchant,	1842
Palmer,* Thomas, Esq. Merchant, Calcutta,	1838
Palmer, Charles, Esq. Medical service, Jessore,	1848
Parsons, Lieut.-Colonel James, C.B., (66th Regiment N. I.) Commandant Gwalior Contingent, Gwalior,	1838
Pauling, Geo., Esq. Indigo planter, Poopree, Tirhoot,	1852

Payter,* J. W., Esq. Indigo planter, Bogorah,	1836
Peacock, the Honorable Barnes, Legislative Member of the Supreme Council, Calcutta,	1852
Pearychand Mittra, Baboo, Librarian, Public Library, Calcutta,	1847
Peel, The Honorable Sir Lawrence, Chief Justice, Supreme Court, Calcutta, (President)	1842
Penny, Brigr. N., C.B., Commg. at Jullunder,	1852
Pereira, Francisco, Esq. Merchant, Calcutta,	1850
Perroux, A. C., Esq. Pakparah factory, Rajshye,	1851
Pertap Chunder Sing, Rajah, Zemindar, Pakpara,	1847
Peterson, A. T. T., Esq. Barrister, Supreme Court, Calcutta,	1849
Peyton, Capt. J., (Commg. 5th Regt. Nizam's Army) Aurungabad,	1850
Phayre, Captain A. P., Commissioner of Pegu,	1841
Philippe, Clement, Esq. Indigo planter, Balacole, Pubna,	1851
Poe, W. H., Esq. Solicitor, Calcutta,	1850
Porteous, Dr. Geo., Calcutta,	1850
Pottit Parbun Sen, Baboo, Merchant, Calcutta,	1847
Prannauth Bhose, Baboo, Head Accountant, Bank of Bengal,	1847
Pratt, Hodgson, Esq. Civil service, Calcutta,	1850
Preonauth Sett, Baboo, Calcutta,	1852
Price, J. O., Esq. Govt. Cotton Planter, Tezpore, Assam,	1843
Prinsep, Charles Robert, Esq. L.L.D., Standing Counsel, Supreme Court, Calcutta,	1851
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Prosononauth Roy, Baboo, Zemindar, Digaputi, Natore,	1851

RADHANAUTH SIKDAR, Baboo, Calcutta,	1847
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Raikes, Charles, Esq. Civil service, Mynpooree,	1850
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Rayson, P., Esq. Indigo planter, Cossipore facty., viâ Patoolee,	1838
Reddie, R. M., Esq. Merchant, Calcutta,	1846
Reeve, J. W., Esq. Admr. General's Office, Calcutta,	1851
Reid,† J., Esq. Civil service,	1842
Reid, Capt. David, Executive Officer, Deebroghur,	1851
Reynolds, Capt. C. S., (49th Regiment N. I.) Junior Assistant Commissioner of Assam, Luckimpore,	1845

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Richards,† C. J., Esq. Merchant,	1839
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Righy, Capt. Henry, (Engineers) Cuttack,	1852
Ripley, Lieut. F. W., (22d Regt. N. I.) Asst. Commissioner of Arracan, Akyab,	1849
Ritchie, W., Esq. Barrister at Law, Calcutta,	1851
Robinson,* Francis Horseley, Esq. Civil service,	1837
Robinson, G. B., Esq. Merchant, Calcutta,	1845
Robinson, T. M., Esq. Chota Nagpore,	1848
Rogers, Captain T. E., I. N., Superintendent of Marine, Calcutta,	1843
Rose, Wm. Grant, Esq. Merchant, Calcutta, (Vice-President)	1837
Rose, Henry, Esq. Civil service, Jessore,	1847
Ross, R. F., Esq. Merchant, Calcutta,	1847
Ross, Capt. D., Commissioner, Leia Division, Punjab,	1851
Ross, Mr. Robert, Calcutta,	1851
Ross, J. G., Esq. Deputy Magistrate, Rohtuk	1852
Row, John, Esq. Medical service, Dacca,	1849
Ruffeeoodeen, Prince Mahomed, Russapuglah, near Talleegunge,	1851
Ruspini, Rev. W. O., Presidency Chaplain, Calcutta,	1850
Russell, C. D., Esq. Civil service, Jessore,	1839
Russell, A. E., Esq. Civil service, Purneah,	1847
Russickissen Mullick, Baboo, Deputy Collector, Burdwan,	1847
Rutherford,† Major W., (28th Regt. N. I.)	1847
SAGE, Lieut.-Colonel (48th Regt. N. I.) Suptdg. Engineer, N. E. Provinces, Allahabad,	1845
Sagore Dutt, Baboo, Merchant, Calcutta,	1850
Samuells,* Edward A., Esq. Civil service, Calcutta,	1836
Sandeman, Hugh, Esq. Civil service, Banda,	1850
Sandes, M. F., Esq. Barrister, Calcutta,	1851
Sapte, Brand, Esq. Civil service, Punjab,	1851
Sarkies, P. J., Esq. Merchant, Calcutta,	1838
Savi, John Robert, Esq. Indigo planter, Sindooree, Jessore,	1836
Savi, Thomas, Esq. Indigo planter, Kishnaghur,	1851
Sconce,† Archibald, Esq. Civil service,	1839
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Scott,† Hercules, Esq. Civil service,	1848
Scott, Capt. Geo., (6th Lt. Cavalry) Dy. Pay Master, Benares,	1851
Scott, Dr. D., Medical service, Hansi,	1852
Sharpe, the Reverend James, Chaplain, Loodianah,	1843
Shawe, M., Esq. Civil service, Sylhet,	1842
Shib Cunder Deb, Baboo, Deputy Collector, Calcutta,	1847
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Shib Kissen Banerjee, Baboo, Merchant, Calcutta,	1850

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Sinclair, Lieut. J. J. De.C, Commg. Artillery, United Malwa Contingent,	1851
Skinner, Capt. James, Belaspore, viâ Secundrabad,	1851
Skinner,† C. Bruce, Esq. Barrister at Law,	1851
Skipwith, F., Esq. Civil service, Sylhet,	1842
Sleeman, Lieut.-Colonel William Henry, (1st Regiment N. I.) Resident at Lucknow,	1836
Small,† James, Esq.,	1843
Smith, Samuel, Esq. Proprietor of the *Hurkaru* Newspaper, Calcutta,	1835
Smith, George Henry, Esq. Civil service, Delhi,	1835
Smith, Edward, Esq. Merchant, Calcutta,	1841
Smith,† Sidney George, Esq. Civil service,	1849
Smith, Major L. H., (6th Regt. Light Cavalry) Meerut,	1849
Smith, Gow M., Esq. Indigo planter, Jessore,	1850
Smith, Capt. E. Fleetwood, 2nd in command Assam Light Infantry, Deebroghur,	1852
Smyth, Capt. J. H., (Artillery) Jullundur,	1851
Sparkes, Capt. T. P., Assistant Commissioner, Arracan,	1852
Spottiswoode, Major H., (Commanding 21st N. I.) Sealkote,	1852
Sreekissen Sing, Baboo, Calcutta,	1835
Stalkartt, William, Esq. Merchant, Calcutta,	1845
Staples,† Capt. N. A., (Artillery,)	1847
Staunton, M. S., Esq. Assistant Military Auditor General's Office, Calcutta,	1836
Steers, Thomas, Esq. Merchant, Calcutta,	
Stephenson, R. M., Esq. Railway Commissioner, Calcutta,	1844
Stevenson,*† William, Esq. Junior, M.D.,	1834
Stewart,* Major W., (22nd N. I.) Governor General's Agent, Benares,	1837
Stewart, Wm. McAdam, Esq. Merchant, Calcutta,	1851
Stiven, W. S., Esq. M.D., Medical service, Moradabad,	1852
Stopford,† Robert, Esq. Merchant,	1848
Storm, William, Esq. Merchant, Calcutta,	1829
Stowell, C. S., Esq. Merchant, Agra,	1839
Strong, F. P., Esq. Medical service, Calcutta,	1827
Stuart, James, Esq. Merchant, Calcutta,	1847
Sutherland, Patrick, Esq. Assistant Military Board Office, Calcutta,	1838
Sutherland, Charles J., Esq. Merchant, Calcutta,	1838
Sutt Churn Ghosal, Rajah, Calcutta,	1838
Swatman, Major William, (65th Regiment N. I.) Lahore,	1845
TAYLOR, George, Esq. Barrister at Law, Calcutta,	1845
Taylor, Capt. P. M., (Nizam's service) Lingsauggoor,	1849
Teil, John, Esq. Kidderpore,	1846

	Admitted.
Terry, W., Esq. Indigo planter, Midnapore,	1846
Thelwall, Capt. J. B., (H. M. 24th Regt.) Sealkote,	1851
Thiault, G., Esq. Merchant, Calcutta,	1851
Thomas, R. M., Esq. Solicitor, Calcutta,	1849
Thomas, J. P., Esq. Merchant, Calcutta,	1852
Thomason, The Honorable James, Lieutenant Governor of the N. W. Provinces, Agra,	1831
Thomson, R. Scott, Esq. Surgeon, Calcutta,	1838
Thomson, William, Esq. Merchant, Calcutta,	1848
Thornton, John, Esq. Civil service, Agra,	1842
Thurburn,† R. V., Esq. Merchant,	1844
Tonnochy, Thomas, Esq. Deputy Collector, Bolundshuhur,	1843
Tranter, Geo., Esq. Medical service, Meheedpore,	1840
Trevor, Edward Tayler, Esq. Civil service, Chittagong,	1840
Tripp, H. D., Esq. Indigo planter, Pubna,	1852
Troup, Capt. R., (63rd N. I.) Commandant 2nd Oude Local Infantry, Sultanpore,	1849
Tucker, Henry Carre, Esq. Civil service, Allahabad,	1837
Tucker, Henry Carre, Esq. Secy. for the time being Local Committee, Allahabad.	1851
Turnbull, Lieut. A. D., (Bengal Engineers) Roorkee,	1851
Turnbull, Capt. M. J., Army Clothing Agent, Calcutta,	1852
Turner,*† Thos. Jacob, Esq. Civil service,	1836
Turner,† Alfred, Esq. Merchant,	1847
Twemlow, Brigadier George, (Nizam's Army) Aurungabad,	1841
Tynan, John, Esq. Calcutta,	1847
VARDEN, A. M., Esq. Merchant, Calcutta,	1851
Vetch, Major H., (54th Regt. N. I.) Depy. Commissioner of Assam, Gowhatti,	1842
Vincent, W., Esq. Indigo planter, Cawnpore,	1846
Vizianagram, Meerza Rajah Vizeram Guzputty Rauze Bahadoor, Rajah of	1847
Vos, J. M., Esq. Architect, Calcutta,	1847
WALLACE, A., Esq. Merchant, Calcutta,	1843
Walter, Dr. J. K., Medical service, Rungpore,	1852
Walters,*† Henry, Esq.,	1836
Ward, J. J. Esq. Civil service, East Burdwan,	1852
Warwick, B., Esq. Calcutta,	1849
Warwick, † Chas., Esq. Merchant,	1850
Watson, † James, Esq. Merchant,	1850
Watson,* Robert, Esq. Calcutta,	1837
Watson, John, Esq. Merchant, Calcutta,	1852
Wauchope, S., Esq. Civil service, Hooghly,	1848
Weld, Lt. Geo., Fort Adjutant, Chunar,	1851
West, C. H., Esq. Merchant, Lahore,	1850

	Admitted.
Western, Major J. R., (Engineers) Jullundur,	1842
Western, J., Esq. (Horse Artillery) Bangalore,	1859
Whampoa, Mr., Merchant, Singapore,	1850
Whitelock, T. W., Esq. Surgeon, Nizam's Army, Hingolee,	1852
Wienholt, W., Esq. Merchant, Calcutta,	1848
Wight,* Robert, Esq. M. D., Madras Medical service, Superintendent Govt. Cotton plantations, Coimbatore,	1836
Wilby, G. R., Esq. Editor of the *Delhi Gazette*, Delhi,	1851
Williams, Fleetwood, Esq. Civil service, Bareilly,	1840
Williamson, Lieut. James, (49th Regt. N. I.) 5th Regt. Punjab N. I., Dhera Ghazee Khan,	1849
Willis, Joseph, Esq. Merchant, Calcutta,	1827
Wilson, A. G., Esq. Deputy Magistrate, Gyah,	1847
Wilson, Thomas, Esq. Deputy Opium Agent, Ghazeepore,	1848
Wilson, J. C., Esq. Civil service, Moradabad,	1851
Wilson, H. R., Esq. Deputy Collector, Budaon,	1852
Wingrove, E., Esq. Merchant, Calcutta,	1846
Withecombe, J. R., Esq. Civil Asst.-Surgeon, Darjeeling,	1851
Withers, H. H., Esq. Merchant, Calcutta,	1852
Wodehouse,† The Honorable P. E., Ceylon Civil service,	1846
Wood, W. H. J., Esq. Merchant, Calcutta,	1851
Wood, Dr. Andrew, Medical service, sealkote,	1852
Woomeschunder Ghose, Baboo, Merchant, Calcutta,	1851
Wray,† L., Esq.	1840
Wray, G. O., Esq. Calcutta,	1852
Wyatt, Thomas, Esq. Civil service, Rungpore,	1836
Wyatt, G. N., Esq. Indigo planter, Champarun,	1848
Wyatt, S. G., Esq. Office of Accounts, Treasury,	1851
Wyld, Capt. W., (4th Lancers) Sealkote,	1851
Wylie, Macleod, Esq. Barrister, Supreme Court, Calcutta,	1844
Young, G. L., Esq. Indigo planter, Midnapore,	1845
Young, Robert, Esq. Berhampore,	1850
Young, R. H., Esq. Indigo planter, Baraset,	1851

BYE-LAWS.

CHAPTER I.

Object.

The promotion and improvement of the Agriculture and Horticulture of India, constitute the object of the Society.

CHAPTER II.

Constitution.

The Society consist of Members, Honorary and Corresponding Members, and Associates.

CHAPTER III.

Proposal and Election of Members.

Section 1.—Persons of every nation shall be eligible as Members of the Society.

Section 2.—Candidates for admission as Ordinary Members shall be proposed by two Members at a General Meeting, and ballotted for at the succeeding Meeting, when a majority of votes shall determine the election.

Section 3.—Persons so elected shall have immediate notice thereof transmitted to them by the Secretary, accompanied by a copy of the Bye-Laws.

Section 4.—Ordinary Members shall pay an admission fee of 8 Rs., and the same sum quarterly, in advance, (commencing from the quarter of the year in which they are elected,) so long as they continue resident in India. It shall be optional for any Member to compound for the quarterly contributions by the payment of Rs. 400 to the funds of the Society.

Section 5.—The payment of the admission fee shall be considered as distinctly implying the acquiescence of every Member elected into the Society in all the Rules, Regulations, and Bye-Laws thereof. A Member retiring from the Society shall be exempted from the payment of a second admission fee on re-election.

Section 6.—Members whose absence from India shall not extend beyond four years, shall continue to be borne on the list of Members, but shall be exempt from the payment of subscriptions until their return to the country.

Section 7.—When any Member shall be in arrear of his annual contribution for one year, he shall be apprised by letter, addressed to his last known place of residence, that unless the amount due by him be paid within six months of the date of notice, his name shall be removed from the list of Members; and in the event of his omitting to pay the amount within the time limited, his name shall be removed accordingly, and published in the proceedings of the Society as a Defaulter.

Section 8.—Ladies may be admitted as Members upon the same terms, and under the same regulations in all respects, as Gentlemen.

CHAPTER IV.

Withdrawal of Members.

Section 1.—Any Member may withdraw from the Society by intimating his wish to do so by letter addressed to the Secretary, without continuing his subscription beyond the quarter of the year in which his resignation is sent in; subject nevertheless to his name being published among the Defaulters (as per section 7 of chapter iii.) if his arrears of subscriptions are not paid.

Section 2.—A resigning Member shall be at liberty to withdraw his letter of resignation, on payment of arrears, without going through the form of re-election; provided such notice of withdrawal be given during the year in which the resignation has been notified.

CHAPTER V.

Privileges of Members.

Section 1.—The Members have the right to be present and to vote at all General Meetings; to propose Candidates for admission into the Society as Members, as also to have personal access to the Museum, Library, and Garden of the Society, and to introduce visitors at the Ordinary Meetings.

Section 2.—Members shall be entitled to a share of all seeds purchased by, or presented to the Society; they can indent, at least once a year, on the Society's Garden for plants; they shall also be entitled to a copy of the Society's Journal, published subsequently to their election, and to previously published volumes on payment of the cost charges.

Section 3.—Members in the country applying for seeds shall distinctly state to whose care such seeds are to be delivered in Calcutta, or how otherwise they are to be forwarded: the Society cannot despatch them at its own expense.

Section 4.—Only Members actually resident in India shall have claims upon the Society's Garden, or seeds imported by the Society, or copies of the Journal, unless they continue their subscriptions while abroad.

Section 5.—Members resident in Calcutta and its suburbs, whose subscriptions are three quarters in arrear, shall be debarred from all the privileges above mentioned. The same rule is applicable to Members in the country, who are four quarters in arrear.

CHAPTER VI.

Of Honorary Members.

Section 1.—Honorary Members shall be persons eminent for their knowledge of, or encouragement given to Agriculture or Horticulture, or for services rendered to the Society.

Section 2.—Persons proposed as Honorary Members shall be recommended by the Council, they shall be ballotted for like Ordinary Members, but three-fourths of the votes shall be required to determine their election.

Section 3.—Honorary Members shall be exempted from the payment of fees and contributions; and they shall be entitled to all the privileges of Ordinary Members.

Section 4.—No office-Bearer of the Society shall, in future, be eligible as an Honorary Member during his tenure of office.

CHAPTER VII.

Of Corresponding Members.

Section 1.—The Corresponding Members of the Society shall be constituted of such persons, not resident in Calcutta, or within one hundred miles thereof, as may show a willingness to promote the objects of the Society.

Section 2.—**Corresponding Members shall not be limited as to numbers; they shall have the privilege of attending the Meetings** of the Society, but shall have no voice in the business; they shall receive such copies of the Society's Journal as may contain their contributions, but shall not be entitled to receive seeds, plants, &c.

Section 3.—Persons proposed as Corresponding Members shall be recommended by the Council, they shall be ballotted for like Ordinary Members, but three-fourths of the votes shall be required to determine their election.

CHAPTER VIII.

Of Associates.

Section 1.—Associates shall be persons well known for their practical knowledge of, or encouragement given to Agriculture or Horticulture, or for services rendered to the Society, but who are not likely to apply to become Ordinary Members.

Section 2.—Persons proposed as Associates shall be recommended by the Council, they shall be ballotted for like Ordinary Members, but three-fourths of the votes shall be required to determine their election.

Section 3.—Associates shall be exempted from the payment of fees and contributions: they shall have all the privileges of Ordinary Members, except that of voting at Meetings of the Society.

CHAPTER IX.

General Meetings.

The General Meetings to be held by the Society shall be of three kinds: 1st, Annual—2nd, Ordinary—3rd, Special.

CHAPTER X.

Anniversary General Meeting, Election of Officers, Council, and Committees, Annual Report.

Section 1.—An Anniversary General Meeting shall be held in January of each year, for the election of Officers and Council for the ensuing year, for the nomination of the several Standing Committees, and to receive and hearr ead the Annual Report on the financial and general concerns of the Society.

Section 2.—**The Officers shall consist of—**

- 1 **President.**
- 4 **Vice-Presidents.**
  - **(Two of whom shall always be natives.)**
- 1 **Secretary.**
- 1 **Deputy-Secretary and Treasurer.**

Section 3.—The President and Council shall, previous to the Meeting, nominate the persons whom they recommend for election as Office-Bearers and Council; and ballotting lists containing the names of the Members recommended, leaving a blank column opposite for such alterations as Members may wish to make, shall be prepared one week before the day of election. A copy of the list shall be handed to each Member present at the Meeting, and should he disapprove of any name or names, or be desirous of inserting some other name or names, he shall erase or insert accordingly.

Section 4.—The Chairman shall appoint two Scrutineers, not Members of the Council, to examine the lists and report the result to the Meeting.

Section 5.—In the event of a vacancy during the year in the list of Officers or Council of the Society, such vacancy shall be filled up for the remainder of the year on the recommendation of the Council, at the second Monthly Meeting after the occurrence of such vacancy.

Section 6.—With the exception of the President, Secretaries and Treasurer, the Office-Bearers of the Society after a tenure of office during two years, shall not be eligible for re-election till the expiry of twelve months.

Section 7.—The revision of the various Standing Committees shall also take place at each Anniversary Meeting, consisting of the following :-

Sugar Committee.
Cotton Committee.
Silk, Hemp, and Flax Committee.
Coffee and Tobacco Committee.
Oil and Oil-Seed Committee.
Grain Committee.
Implements of Husbandry and Machinery Committee.

Nursery Garden Committee.
Fruit and Kitchen Garden Committee.
Floricultural Committee.
Translation Committee.

Section 8.—The Council shall consist of the Office-Bearers and twelve Members.

Section 9.—No person shall hold at the same time more than one of the following offices: viz. President, Vice-President, or Secretary.

Section 10.—The Council shall elect from their own body, Sub-Committees of Finance and Papers, whose reports on all matters referred to them shall be submitted to the Council.

CHAPTER XI.

Ordinary and Special General Meetings.

Section 1.—Ordinary General Meetings shall be held at the Society's apartments, Metcalfe Hall, on the second Saturday of every month throughout the year, at the hours of 4 P.M. from October to March, and at 4½ P.M. from April to September, unless circumstances should render it expedient in the opinion of the Council, or any General Meeting, to alter the day of the next General Meeting.

Section 2.—Strangers may be present at the Ordinary General Meetings, if introduced by Members, and their names given to the President for record.

Section 3.—The ordinary course of procedure at the General Meetings, shall be as follows:—

1. The proceedings of the preceding General Meeting shall be read and submitted for confirmation.
2. The names of the gentlemen proposed as Members at the last Meeting shall be announced for ballot.
3. Motions of which notice was given at the last Meeting shall be brought forward and disposed of.
4. Notice of motions shall be given for entry in the proceedings of the Meeting.
5. The names of gentlemen proposed as Members, shall be announced.
6. The various reports, &c., on questions referred to the Council, shall be submitted for consideration.

7. Papers and communications, received since the last Meeting, together with their respective presentations, shall be brought to notice.

Section 4.—Special General Meetings may be convened at any time, on a requisition to that effect to the President, signed by at least six Members, who thereupon will call the same, through the Secretary, or Deputy-Secretary, by public advertisement in three of the newspapers of the Presidency. No Special Meeting shall take place without a month's previous notice being given, unless the case be urgent.

Section 5.—No stranger shall be permitted to be present at Special Meetings of the Society.

Section 6.—Notice of motion on questions of Finance, or other matters of importance, shall be given at a General Meeting, preceding that on which the subject is to be disposed of, in order that Members who take an interest in the question may have an opportunity of expressing their assent or dissent; and no motion of which notice has not been given, shall be carried at the Meeting at which it is proposed, if any three Members present vote for its postponement.

Section 7.—Motions of which previous notice has been given shall take precedence of all others.

Section 8.—Mofussil Members shall have the privilege of voting on questions of which one month's notice is given, sending their votes, post paid, to the Secretary, for record.

CHAPTER XII.

Council,—Powers and Duties.

Section 1.—The government of the Society and the management of its concerns are entrusted to the Council, subject to no other restrictions than are imposed by the Bye-Laws, and to no other interference than may arise from the decisions of the Members assembled in General Meetings.

Section 2.—The Council shall meet once at least in every calendar month throughout the year, on such day or days as they shall deem expedient.

Section 3.—No Meeting of the Council shall be competent to enter on, or decide any business, unless three or more Members be present.

Section 4.—The Council may appoint persons, not Members of it, to be salaried Clerks or Servants, for carrying on the necessary concerns of the Society, and may define the duties to be performed by them respectively, and may suspend any Clerk or Servant from office whenever it shall appear to them necessary: provided always, that such appointment or suspension shall be reported to the next General Meeting of the Members, to be confirmed or annulled as may be decided by such Meeting.

Section 5.—The Council shall present and cause to be read to the Anniversary General Meeting, a Report on the general concerns of the Society for the preceding year. The Report shall state the income and expenditure, the receipts and disbursements, and the increase or decrease of the Society during that year: and give an estimate in detail of the probable income and expenditure of the succeeding year.

Section 6.—The Council shall distribute seeds and plants to all public gardens, reporting their proceedings to the next Meeting of the Society. No other resolution of the Council for disposing of or pledging the funds or property of the Society to any amount beyond the current expences of the establishment shall be acted upon or be of any validity, until confirmed by the Society.

Section 7.—The President, or in his absence one of the Vice-Presidents, or in their absence the senior Member, shall preside at every Meeting of the Council.

Section 8.—All questions shall be decided by ballot, on the demand of any Member present; and the decision of the majority shall be considered the decision of the Meeting.

CHAPTER XIII.

The Duties of the President and Vice-Presidents.

Section 1.—The business of the President shall be to preside at all the Meetings of the Society, and regulate all the proceedings therein: and generally to execute, or see to the execution of the Bye-Laws and orders of the Society.

Section 2.—In case of the absence of the President from any of the Meetings, his place shall be filled by the senior Vice-President then present, and in the absence of the Vice-Presidents, by the senior Member present, who shall, for the time being, have all the authority, privilege, and power of the President.

CHAPTER XIV.

Of the Secretary and Deputy-Secretary.

Section 1.—The Secretary, or in his absence the Deputy-Secretary,* shall exercise a general inspection over the servants and the affairs of the Society, and shall see that the Bye-Laws and orders of the Society are executed: he shall also attend the Meetings of the Society, and read such papers as may be submitted.

Section 2.—The Secretary, or in his absence the Deputy-Secretary, shall sign all letters and papers emanating from the Society.

Section 3.—The Deputy-Secretary shall draw up the correspondence of the Society, and be in daily attendance at the Society's apartments during the usual office hours.

CHAPTER XV.

Of the Treasurer and the Accounts.

Section 1.—The Treasurer shall demand and receive for the use of the Society, all moneys due by or payable to the Society, and shall keep full and particular accounts of all sums so received and paid.

Section 2.—The moneys as received shall be deposited in the Bank of Bengal; and when the surplus shall exceed Rupees 1,000 it shall be invested in Company's Securities, on behalf of the Society, in the name of the Government Agent for the time being.

CHAPTER XVI.

Of Committees.

Section 1.—Besides the Standing Committees (section 7, chapter x.) the Members assembled in General Meetings may appoint Committees to report on any special matter, relating to the objects or concerns of the Society.

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* There is no Deputy-Secretary now.

Section 2.—Every Committee shall cause minutes to be taken of its proceedings.

Section 3.—Every Committee may appoint its own Chairman and Secretary.

Section 4.—Any Member of any Committee, who shall be personally interested in any question before that Committee, shall withdraw during the consideration of, and vote upon the same, and shall not take part in any Report that may be drawn up upon the matter for submission to the Society.

Section 5.—The Secretary shall be, *ex-officio*, a Member of all Committees.

CHAPTER XVII.

Of the Publications of the Society.

Section 1.—The Journal, or other publications of the Society, shall be under the superintendence of the Council, and shall be printed from time to time, whenever a sufficient number of such papers as may be deemed of public utility have been collected to form part of a volume.

Section 2.—Contributors to the Journal, &c., shall be entitled to twenty-five copies of their papers.

CHAPTER XVIII.

Distribution of Prizes.

Section 1.—The distribution of Prizes at the Periodical Vegetable and Flower Shows of the Society shall be undertaken by the President or senior Vice-President. In the absence of such Officer or Officers, the senior Member of the Committee, to whom the arrangements of the Show are entrusted, shall perform that duty.

Section 2.—The Council shall have the power of adopting from time to time any regulations for the management of the Shows that may seem to them expedient.

CHAPTER XIX.

Amendments of the Bye-Laws.

Amendments or alterations of the Bye-Laws may be proposed at any Ordinary Meeting of the Society: they shall, with the assent of the majority of the Members present, be entered on the minutes, and if ordered by the said majority to lie over for consideration, the President shall direct them to be read by the Secretary, and stated for discussion at the next General Meeting; and if three-fourths of the members, provided that not less than eleven Members be present, shall vote in favour of adopting them, they shall be recorded as a part of the Bye-Laws.

Universal Life Assurance Society.

ESTABLISHED IN LONDON AND CALCUTTA, 1834.

London Office, No. 1, King William Street.

Chairman.—Sir HENRY WILLOCK, K. L. S.

Indian Branch.

DIRECTORS.

CHARLES R. PRINSEP, Esq.	WILLIAM H. SMOULT, Esq.
W. W. KETTLEWELL, Esq.	WILLIAM GREY, Esq.

JAMES JOSEPH MACKENZIE, Esq.

PHYSICIAN.

JOHN JACKSON, Esq.

SOLICITORS.

MESSRS. SANDES AND WATTS.

AGENT AND SECRETARIES.

MESSRS. BRADDON and Co.

MADRAS.	BOMBAY.
Agents.	*Agents.*
MESSRS. BAINBRIDGE & Co.	MESSRS. LECKIE & Co.

The advantages offered by this Society to persons insuring in India, are :—

1st.—The security to Policy-holders of a large invested capital amounting to £580,000, of which 42 lacs are advantageously invested in India.

2nd.—An annual valuation of assets and liabilities, and a division of three-fourths of the profits among whole-life policy-holders at the higher rate of premium after the sixth year of Assurance. The reductions during the past thirteen years under this provision have averaged 49 per cent. on the original annual premia.

The following table will shew the result of the last division of profits as declared on the 12th May, 1852, which is equivalent to a reduction of 45 per cent., on current annual premia of Policies entitled to participation, and this reduction is allowed on the English rates where insurers have returned to Europe for a permanent residence :—

Age.	Date of Policy.	Sum assured.	Original Annual Premium.	Reduction.	Reduced Annual Premium.
		Co.'s Rs.	Co.'s Rs.	Co.'s Rs.	
20	on or	10,000	420	189-0	231-0
30	before	10,000	480	216-0	264-0
40	the 12th	10,000	590	265-8	324-8
50	May,	10,000	740	333-0	407-0
60	1847.	10,000	1,030	463-8	566-8

3rd.—Lower rates of Premium for short term Policies and for Assurance for life *without* participation in profits.

The following is an extract of these rates.

Annual premium for an Assurance of Rs. 1,000.

CIVIL.

Age.	1 year.	3 years.	5 years.	7 years.	Life without profits.
20	22	22	23	24	32
30	27	28	28	29	39
40	32	32	32	33	49
50	38	40	40	43	62
60	41	52	56	60	88

MILITARY.

	1 year.	3 years.	5 years.	7 years.	Life without profits.
20	26	27	28	28	36
30	32	32	33	34	45
40	39	40	40	40	53
50	45	46	47	48	64
60	56	57	60	64	90

4th.—Immediate reduction to the English rates of premium on return of Assurers to Europe for a permanent residence, both on the participating and non-participating scales.

5th.—Premium payable annually, half-yearly, or quarterly.

Tables of rates, forms and instructions for effecting Assurance, can be obtained on application to the Secretaries, or to

Mr. FRANCIS SMYTH,	Dinapore.
Messrs. TUTTLE and CHARLES,	Benares.
Messrs. PELLETREAU and Co.,	Mirzapore.
Mr. K. McIVER,	Agra.
Mr. HUGH CAVANAGH,	Cawnpore.
Mr. GEORGE BERESFORD,	Delhi.
Messrs. GIBBON and Co.,	Meerut.
Mr. M. B. ELIAS,	Simla.
The MANAGER LAHORE CHRONICLE PRESS,	Lahore.

BRADDON AND Co.

CALCUTTA : 2*nd May*, 1853.

Agents and Secretaries.

List of Orchideous Plants Indigenous to Assam and the Neighbouring Hills of Khasya, Bootan, &c.

No.	Names.	Size and Colour of Flower.	Habit	No.	Names.	Size and Colour of Flower.	Habit.
1*	Microstylis Wallichii ?	Small, pea green	Ter	43	Eria dens flora	Largish, white tinged with yellow	Epi.
2	Oberonia indifolia	Minute, yellowish	Epi	50	,, ferruginea	,, ferrugineous	Do.
3*	,, sp.	,, ,,	Do.	51	,, paniculata	Small, spotted with purple	Do.
4	Liparis sp.	Small, yellow	Do.	52**	,, sp.	Largish, white	Do.
5	,, sp.	,, ,,	Do.	53*	,, sp.	,, ,, & dull purple	Do.
6**	,, sp.	Largish, green yellow	Ter.	54*	,, sp.	,, ,, ,,	Do.
7*	,, sp.	Small, deep purple	Epi.	55*	,, sp.	Minute, rosy	Do.
8	Otochilus fuscus	,, yellowish brown	Do.	56	Aporum anceps	Small, white	Do.
9	,, albus	,, ,, and white	Do.	57	,, cuspidatum	,, ,,	Do.
10	Pholidota imbricata	,, white	Do.	58	,, sp.	,, ,,	Do.
11	,, undulata	,, ,,	Do.	59*	,, sp ?	Largish, white, yellow, and brown	Do.
12*	,, articulata	,, ,,	Do.	60	Dendrobium Pierardi	Large, pink and yellow	Do.
13*	,, sp.	,, ,, and yellow	Do.	61*	,, hetercaropum,	,, yell. and br. fragrant	Do.
14*	,, sp.	,, ,, ,,	Do.	62	,, Curysanthum	,, lively yell. and brown	Do.
15	Cœlogyne flavida	,, yellow	Do.	63*	,, Paxtoni	,, ,, ,,	Do.
16	,, undulata	Largish, white	Do.	64*	,, sp like do.	,, orange and brown	Do.
17*	,, fimbriata ?	,, ,, and brown	Do.	65*	,, formosum	Very large, white and yell. fragrant	Do.
18*	,, uniflora	,, ,, and lateritious	Do.	66**	,, longicornu,	Large, white and orange	Do.
19	,, barbata	,, white	Do.	67	,, calceolus	Very dark yellow, rose, and purple	Do.
20**	,, præcox ?	,, ,,	Ter	68*	,, suleatum,	Large, yellow and purple	Do.
21*	,, maculata	Large, white, yellow, & rose	Do.	69	,, Jenkinsii	,, lively yellow	Do.
22**	,, Wallichiana	,, ,, aad rose	Do.	70	,, cærulescens	,, deep lively purple	Do.
23**	,, ocellata	,, pale yellow and deep orange	Do.	71	,, nobile	,, white rosy purple	Do.
24*	,, Gardneriana	,, white and yellow	Epi	72**	,, Gibsonii	,, yellow and brown	Do.
25	,, cristata	,, ,, streaked with bright yellow	Ter.	73*	,, stuposum	Small, white	Do.
26	,, sp.	Small, brown and yellow	Epi.	74*	,, Cambridgeanum	Large, lively yellow and brown	Do.
27**	,, flava ?	Large, yellow and brown	Do.	75**	,, transperens	,, deep lively purple	Do.
28	,, sp.	Small, brown and yellow	Do.	76*	,, like do , various	,, pale rose and purple	Do.
29*	,, sp.	,, white and brown	Do.	77**	,, Devonianum	,, lilac rose & yellow	Do.
30	,, sp.	,, pale yellow	Do.	78**	,, Dalhousianum	,, rose, white and purple	Do.
31**	,, sp.	,, white (pretty)	Ter	79	,, multicaule	,, white and purple	Do.
32**	,, sp.	Largish, pale cinnamon	Epi.	80**	,, Griffithii	,, pale yellow and orange.	Do.
33**	Bolborhyllum leopardinum	Large, yellow spotted with purple	Do.	81**	,, Farmeri	,, lively ,, ,,	Do.
34	,, umbellatum	Largish, dull yellow	Do.	82**	,, densiflorum pallid	,, white and orange	Do.
35**	,, Khasyanum	Small, greenish	Do.	83**	,, do. roseum	,, pale rose and orange	Do.
36**	,, sp.	Largish, bright yellow	Do.	84	,, intermedium	,, pale yellow and brown	Do.
37*	,, sp.	Small, white, fragrant	Do.	85*	,, sp.	,, lively orange	Do.
38*	,, sp.	,, dull purple	Do.	86*	,, sp.	,, ,, yellow and brown	Do.
39	,, sp.	,, ,,	Do.	87**	,, sp.	,, yellow, pink, and brown	Do.
40	,, sp.	,, ,,	Do.	88*	,, sp.	,, pink and yellow	Do.
41**	Cirrhopetalum sp.	Small, greenish, fragrant	Do.	89**	Spathoglottis pubescens	Largish, yellow and purple	Ter.
42	,, sp.	,, dull purple	Do.	90	Arundina bambusifolia	Large, pale rose & lively purple	Do.
43*	,, sp.	Large, brown and yellow	Do.	91*	Phaius granditolius	,, white, brown, and purple	Do.
44**	,, sp.	Largish, dull purple	Do.	92	,, Walichii	,, ,, ,, ,,	Do.
45**	,, sp.	,, ,,	Do.	93*	,, maculata	,, ,, rosy scented	Do.
46*	Tricosina suavis	Large, white, purple & yellow	Do.	94*	Phaius albus	,, ,, ,, ,,	Do.
47*	Eria flava	Largish, dull yellow & brown	Do.	95**	Aputaria senilis	Largish, [illegible]	D

[illegible]	[illegible]	Large, green and white	[illegible]	[illegible]	Cymbidium [illegible]	Small, brown	[illegible]
98**	,, sp.	,, dull yellow and brown	Do.	139	Cymbidium longipetalum	Largish, green and purple	Do.
99**	,, sp.	,, deep purple	Do.	140*	,, cyprifolium	,, ,, ,,	Do.
100**	,, sp.	,, green and yellow	Do.	141**	,, sp.	Large, fragrant yellow and white	Epi.
101**	,, sp.	,, purplish green	Do.	142**	,, sp.	,, brownish purple	Do.
102	Vanda teres	Very large, rosy purple yell. and brown	Epi	143**	,, sp.	Very large, white	Do.
103**	,, cristata	Largish, greenish, white and purple	Do.	144**	,, sp.	Large, white and brown	Do.
104**	,, multiflora	,, white and rose	Do.	145**	,, sp.	,, green and dull purple	Ter.
105**	,, cœrulea	Very large, deep blue	Do.	146*	? Phalœnopsis, sp.	Large, yellow and reddish brown	Epi.
106**	,, sp.	Largish, dull purple	Do.	147	Euphorboscis pygmæa	Minute, yellow	Do.
107**	,, sp.	,, ,, and green	Do.	148	Geodorum dilatatum	Large, white, purple and yellow	Do.
108**	,, sp.	,, yellow and brown	Do.	149*	,, sp.	,, deep rosy purple & white	Do.
109**	Camarotis purpursa	Small, yellow and purple	Do.	150**	Platanthera sp.	Large, white	Do.
110	Micropera pallida	,, pale yellow	Do.	151**	Peristylis sp.	Largish, white, sweet-scented	Do.
111	Saccolabium micrantum	Small, rosy	Do.	152	Habenaria hamigera !	Small, green	Do.
112	,, retusum	Largish, lively spotted	Do.	153	,, sp.	,, yellow	Do.
113	,, papillosum	Small, pale yellow and purple	Do.	154	,, sp.	,, greenish, yellow	Do.
114**	,, Calceolare	,, yellow and brown	Do.	155*	,, sp.	,, white	Do.
115**	,, sp. like do.	,, pale do. and rose	Do.	156**	,, sp.	Large, white	Do.
116	,, caroifolium	,, rosy	Do.	157**	Pogonia Joliana	Small, rosy white	Do.
117**	,, dasypogun	,, green and purple	Do.	158**	,, sp.	Largish, green	Do.
118*	,, appendiculatum	,, yellow	Do.	159**	,, sp.	Small, purple	Do.
119*	,, sp.	,, rosy and deep purple	Do.	160**	Cyrtosia sp.	Largish, golden yellow	Do.
120**	Sarcanthus sp.	.. ..	Do.	161**	Spiranthes sp.	Small, white	Do.
121**	,, sp.	Small, rosy	Do	162**	Zeuxine sulcata	,, ,,	Do.
122**	,, sp	,, white and yellow	Do.	163**	Anæctochilus Roxburghii	,, rosy white	Do.
123**	,, sp.	,, ,, ,,	Do.	164**	,, sp.	,, white	Do.
124**	,, sp.	,, ,, ,,	Do.	165**	Cypripedium venustum	Large, green and purple	Do.
125**	,, sp.	,, rosy red	Do.	166**	,, insigne	,, red and yellow	Do.
126	Aerides affine	Large, rosy purple	Do.	167*	Calanthe densiflora	,, lively yellow	Do.
127	,, odoratum	,, ,, sweet-scented	Do.	168**	,, sp.	Small, brown and yellow	Do.
128	,, sp.	,, ,, ,,	Do.	169**	,, sp.	Large, white and green	Do.
129**	,, sp.	Large, like affine, & very sweet scented	Do.	170**	,, sp.	,, ,, and yellow	Do.
130	Agrostophyllium Khasyanum	Small, white	Do	171**	,, sp.	,, dull purple	Do.
131*	Xiphosium acuminatum	Large, white	Do.	172	Goodyera, sp	Small white	Do.
132	Acanthophippium sp.	,, dull purple	Ter.	173	,, sp.	,, ,,	Do.
133*	,, sp.	,, white streaked	Do.	174	,, sp.	,, ,, dull purple	Do.
134*	Cymbidium giganteum	Very large, yellow and brown	Do.	175**	Ophrys sp.	Largish, rosy purple	Do.
135	,, pendulum	Large, dull yellow and purple	Do.	176**	,, sp.	,, green and purple	Do.
136	,, aloifolium	,, ,, ,,	Do.	177**	Anthoginum sp.	,, rosy	Do.
137**	,, eburneum	Very large, white	Do.	178*	Bonatea sp.	Small, green	Do.

Æschynanthus (3 to 4 sp.): Hoya (5 or 6 sp.); Arum (several, Lilium (1 sp); Nepenthes (1 sp.); Ferns and Lycopodiums (150 to 200 sp): Palms (Livistonia, Leoxala, Caryota, Calamus, &c.) are also indigenous, and can be sent if required.

Plants not marked are common. Plants marked with an asterisk are considered rare. Plants marked with two asterisks are considered very rare.

The charges for a box of 4 cubic feet measurement, containing an equal selection of the three kinds, will be 5*l.* or 50 rupees, deliverable at Calcutta. When Plants which are rare or very rare are required, the charges will be according to the kind taken: for the rare 1 r. 8 as. a Plant; for the very rare, 2 rupees a Plant. When very large plants are directed to be sent, no extra charge will be made.

When new Plants, not included in the list, are sent, a separate charge will be made. When two boxes or more are taken a discount of 10 per cent. will be allowed.

Plants can also be sent in glass cases, on the Wardian plan, measuring 2 feet 6 inches in length, 2 feet breadth and 2 feet 7 inches in height, for which an extra charge of 20 rupees will be made. Glass covers can also be supplied for the other boxes, at an extra charge of 10 rupees. Applications to be made to

THE JOURNAL

OF THE

Agricultural & Horticultural Society

OF

INDIA.

Report of the Special Committee appointed at the General Meeting of the Society on the 12*th of June*, 1852, *to examine into the merits and capabilities of the Cotton-cleaning Machines sent in to compete for the Government prize of Five Thousand Rupees, and the Society's Gold Medal.*

1. Your Committee* assembled at the Society's rooms, Metcalfe Hall, on the 17th of June, 1852, and proceeded to elect a Chairman and Secretary.

2. The advertised conditions under which this competition was to be met, were most carefully considered, and it was concluded to republish the same in this stage of the report:—

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* Extract from the Proceedings of 12th June, 1852.

"On the recommendation of the Council, the following gentlemen were appointed a *Special* Committee to examine and report on the cotton-cleaning machines which have been sent in to compete for the Government prize of five thousand Rupees:—

"Messrs. W. Haworth, T. F. Henley, W. Munro, F. J. Siddons, John Thomson, John Ward, and J. M. Vos."

N. B.—Mr. Munro returned to England before the Committee commenced their experiments.

[illegible] The Government of India having at the suggestion of [illegible] Agricultural and Horticultural Society of India, announced that a prize of rupees five thousand shall be given for an improved cotton-cleaning machine, (unrestricted by any particular mechanical principle) such as, in the opinion of the Government, shall have fully attained the principal objects described by the Society, namely, 'to be so perfect in its action in separating cotton wool from the seed, and possessing such qualities of expedition, simplicity, and comparative cheapness, as to render it likely to come into practical use;' and the Agricultural and Horticultural Society having determined to adjudge its gold medal for the same object, it is hereby notified, that the following are the conditions under which the above and other prizes will be awarded:—

Conditions.

"I. The machine shall be capable of separating the ordinary short staple cotton, grown in India, from the seed.

"II. Each competitor shall deposit, free of charge, a full sized working machine in the Society's rooms, Metcalfe Hall, Calcutta, together with a letter descriptive of the machine and the mode of working it, addressed to the Honorary Secretary of the Agricultural and Horticultural Society of India, on or before the 1st January, 1852.

"III. In the event of no machine being deemed worthy of the full amount of 5,000 Rs., a smaller prize will be awarded for the best machine offered, in proportion to its merits, in the estimation of the Government of India.

"IV. The Society's Gold Medal will be given with the Government prize of 5,000 Rs., and in the event of there being more than one competitor, a silver medal will be awarded for the next best machine, provided, it shews much ingenuity and comparative success."

3. The most desirable mode of determining the merits of the several machines, and the plan of their arrangement, as well

as the extent of the experiments to which they should be subjected, was settled.

4. It was concluded that the former reports of your several Committees appointed to consider this important subject, should be circulated amongst the members of this Committee, and by them duly considered, with the view of acquainting themselves with the progress hitherto made towards attaining the desirable object of the Society, viz: a simple, perfect, and comparatively cheap cotton-separating machine, adapted to the wants of India.

5. At the first meeting of your Committee, they felt some doubt whether the testing of the machines could be fairly conducted at that season of the year, the rains having set in. The *kupas* collected for experimenting on was ascertained to be very damp, so much so, that on a preliminary trial being made on each machine, it was found to be useless to proceed with the experiments, as no adequate means of drying the cotton were available. They were consequently compelled to postpone further trials until after the rains, when the *kupas* could be sufficiently dried by exposure to solar heat. This circumstance, the Committee trust, may be received as their excuse for the long delay which has taken place since their appointment, before their report could be prepared.

6. The Society having provided for these trials a considerable quantity of each of the following kinds of cotton *kupas*, viz., Bombay, Madras, and Assam, your Committee resolved to test each machine with a sufficient quantity of the three sorts of *kupas* as would, in their opinion, shew their respective merits and capabilities, in separating the cotton from the seed, and in producing the most marketable article at the least expense.

7. The condition of each kind of *kupas* was carefully examined. The Bombay and Madras sorts are believed to be such as produce the cotton generally exported from those

ports in large quantity, both as regards color, staple, and cleanliness, and they appeared to be fair samples of native grown cotton. Of the Assam *kupas*, your Committee can only report, that it appears to be a description of cotton very little known in Calcutta, nor does it appear to have been exported from the country at all: the *kupas* experimented on, is said to be of the best kind produced in that district, color being fair, but the staple is very short, the fibre harsh and coarse, not unlike some kinds of sheep's wool. The seed is small and very rough, the wool adhering most tenaciously to it, making it difficult for any machine to separate effectually the cotton from the seed.

8. The machines sent in for competition were four in number, by the following makers, viz: Mr. Frost, Engineer of the Government cotton works at Dharwar, Bombay, (a saw gin); Messrs. Bates, Hyde and Co. of Massachusetts, United States of America, (a saw gin); Messrs. Carver and Co. of Massachusetts, U. S. (also a saw gin).

Mr. Mornay, Secy. of the Assam Company, Calcutta, (a machine on the Churka principle.)

9. Mr. Frost's machine has seven saws of ten inches diameter placed at 8-10ths in. (eight-tenths of an inch) apart; and intended to be worked by manual labor. Mr. Frost states that he had made about 70 such gins up to October, 1848, but not quite equal in point of workmanship to the one sent to compete for the prize, his price for which is Co.'s Rs. 65. He states that the machine is capable of cleaning 31½℔s of *kupas* in 28 minutes, the power employed being two men turning, and one boy feeding. This is about equal to seers 33. 750 per hour. It is not said what description of cotton was used in this experiment.

10. Messrs. Bates, Hyde and Co.'s machine has fifteen saws of 12¾ inches diameter, placed at six-tenths of an inch apart, and is intended also to be worked by manual labor: the makers accompany it with the following remarks:

"The seed may be ginned more or less clean of the fibre, as may be thought most desirable, it being questionable whether, as a matter of economy, the shorter fibres which remain upon the seeds would add to the value of the cotton. The fibre of the East Indian cotton sent for trial is about half the length of the ordinary upland cotton grown in the South Western States, and the seeds are about half the size, and more nearly round, hard, and plump."

"The cotton grown in Mississippi or Louisiana is more full of trash, leaf and dirt than the East Indian."

"An ordinary sized Eagle Gin, turned by hand, having 15 to 18 saws, will turn out from two to three hundred pounds of clean cotton per day, if properly attended (300℔s. per 12 hours gives 25℔s. cleansed cotton per hour) a gin of 50 saws (turned by power) will give from two hundred to two hundred and twenty-five pounds of clean cotton per hour. Our rule is (for a gin working *to the best advantage* in our Southern States) *one bale* of cotton of 450 pounds per day, to *every ten saws*, say for a 50 saw gin. Five bales per day, a 60 saw gin, six bales (in 12 hours.) The *power* required is three horses or mules of average size and strength, (or a similar amount when steam or water-power is used) to 50 saws."

The prices of the Eagle cotton saw-gins, such as the one sent for competition (15 saws) is $70 (seventy dollars) in Boston.

11. Messrs. Carver and Co's. machine has fifty saws of ten inches diameter; the saws are placed at six-tenths of an inch apart, and is not intended to be worked by manual labour. This machine is too large to be fairly tested by any means within the reach of your Committee for applying sufficient power to obtain the speed required; but the makers state its capabilities to be as follows:—

"Whilst at work upon the East Indian cotton sent for trial, the machine was turned by water-power, and that it may be driven equally as well by steam, horses, mules or oxen:

the saws had 300 revolutions per minute, and it ginned at the rate of 75tbs of cleaned cotton per hour. A higher speed than 300 revolutions may be used without danger or injury to the machine or cotton, and the quantity got through will be increased in nearly the same proportion:"

The makers also state that the gins which they usually make for American use have from 70 to 100 saws in each.

Messrs. Carver and Co. have not stated the price of this machine, but judging from the cost of the smaller one of Messrs. Bates, Hyde and Co., it may, your Committee think, be assumed at about 200 dollars.

12. Mr. Mornay's machine is constructed on the native Churka principle. It has two sets of rollers placed one over the other, each pair has a steel upper roller of seven-sixteenths of an inch in diameter, and a hard wood roller below, one inch five-sixteenths in diameter; that portion of the rollers to which the *kupas* is applied is about five inches long. The machine has two cast-iron side frames, which support the rollers and driving apparatus, the journals of each set of rollers work in gun-metal bearings, inserted in shots in the side frames; these bearings merely act as guides, the whole strain being received upon a combination of friction-wheels placed inside the framing, and of as great a diameter as the space in which they work will admit of. The great novelty of this is a self-acting feeding apparatus, consisting of a table or grate in front of the rollers, formed of rods of iron, a space being left between each; the *kupas* is placed on this grating by hand, and is very evenly spread over its surface, requiring considerable dexterity and constant attention on the part of the person in attendance to keep the rollers supplied with cotton: beneath the grate is a flat table surface, studded with prongs, forming combs, the ends of which, actuated by a crank, come up through the bars at each revolution, causing the points of the comb to push forward the cotton against the rollers.

Mr. Mornay states that he considers this machine worked by hand as only a typical illustration of the principle on which he proposes that a number of such should be worked in combination, to be driven by steam or other power. He estimates the quantity of cotton it can turn out clean at 3lbs. per hour, if proper attention is paid to the feeding: he is not able to give the cost of the machine submitted for competition, but he thinks machines constructed in England, on a large scale, might be made at a cost of Rs. 15 per roller.

It is well to remark here, that the *kupas* intended to be cleaned by this machine requires first to be well opened out, and on a large scale a separate machine for this purpose must be employed, and no such machine has as yet, that your Committee are aware of, been invented.

13. Before proceeding to trial of the several machines, the kupas intended to be acted upon, had all been slightly hand-picked, as is usual, to separate as well as could be, the trash, leaves, and stained cotton.

14. The result of *nine* experiments, being three for each machine on the saw-gin principle, and the details of each trial of the several machines, are set forth in the following tabular statement; and at the foot thereof, is added the particulars of two extra trials, of half an hour duration each, on the two American saw-gins.

15. TABLE OF EXPERIMENTS.

Name of Machine.	Diameter of Saws.	Revolutions of Saw Cylinders per minute.	Experiments.	Description of Cotton.	Quantity of Kupas experimented on.	Time consumed in experiments.	Clean Cotton produced.	Seeds obtained.	Loss or Wastage.	Work done per hour in Kupas.	Work done per hour in clean Cotton.	No. of feet of Saw teeth engaged in producing a seer of clean Cotton.
						M. S.			Ch.	S.		
Mr. Frost's, Engineer Government Cotton works at Dharwar, ...	Seven saws, 10 inches diameter, or say 31 : 4 circumf., ..	325	First,	A. Madras,	4 Seers,	13 0	0 15.725	2 15.925	.350	18.461	4 .536	
			Second,	B. Assam,	1 „	5 45	0 5.750	0 10.175	.750	10.435	3 .750	
			Third,	C. Bombay,	1 „	2 40	0 5.250	0 10.750	.000	22.500	7 .383	
				Total, ..	6 „	21 25	1 10.725	4 4.850	1 .100	16.809	4 .679	76298
Messrs. Bates, Hyde and Co. of Massachusetts, United States of America, ...	Fifteen saws, 12¾ inches diameter, or say 40 inches circumference,	140	First,	D. Madras,	4 Seers,	11 20	1 0.500	2 15.500	.000	21.176	5 .459	
			Second,	E. Assam,	2 „	10 30	0 11.750	1 4.000	.250	11.428	4 .196	
			Third,	F. Bombay,	2 „	5 10	0 10.500	1 5.250	.250	23.226	7 .621	
				Total, ..	8 „	27 0	2 6.750	5 8.750	.500	17.778	5 .382	78093
Messrs. Carver and Co. of Massachusetts, United Sts. of America, ..	Fifty saws, 10 inches diam., or say 31 : 4 circumf., ..	180	First,	G. Madras,	8 Seers,	7 20	2 0.125	5 15.250	.925	65.454	16 .427	
			Second,	H. Assam,	4 „	9 30	1 6.000	2 9.500	.500	25.263	8 .684	
			Third,	I. Bombay,	4 „	4 30	1 4.750	2 11.250	.000	53.333	17 .292	
				Total, ..	16 „	21 20	4 10.875	11 3.000	1 .425	45.000	13.162	107354

Memorandum.—Carver & Co.'s Machine working for half an hour, 4 men at the wheel, who were relieved every five minutes, clean cotton turned out, 5.12
[illegible] .. .. 10. seers 15.12

16. These experiments or trials occupied your Committee several days; they were conducted with great care; the *kupas* was weighed for each trial, and after the cotton had passed through, the cleaned portion as well as the seed and motes were again weighed separately, the particulars carefully noted; and your Committee consider that they have now merely to append such remarks as were suggested by the circumstances attending each trial,—first considering it their duty to record their unanimous opinion, that such trials as these, limited as to the means at the disposal of your Committee for the purpose, can only be taken as an approximation of the capabilities and merits of each machine. The manual labor used was coolies brought from the streets, none of whom had probably ever before been employed in turning a machine of any kind; they were soon fatigued with the work. The machines were fed with *kupas* by Members of the Committee, and to them it was evident that a longer experience of that duty would have enabled them to pass through much more cotton, had the machines been worked at the uniform speed recommended by their several makers; further, it required a much more intimate acquaintance with the peculiar merits and arrangements of the machines, before a correct knowledge could be had of how to adjust the working parts, to obtain the best result for the particular kind of cotton upon which they were to be tried, and some change in the adjustment of some of the parts is required, and means are provided for that purpose, so as to accommodate long or short staple cotton, or to keep the cotton a longer or shorter time under operation, as may be found most desirable.

17. Carver's machine, being on a large scale, having no less than 50 saws, would require (as stated by the makers) steam or other power than manual labor, to turn it; but as your Committee had none available, the amount of work performed by that machine during the trial, falls far short of the estimate of the makers, yet they had every reason to believe

that had it been run at its proper speed, the estimated quantity of work it is capable of doing, as stated by the makers, would have been attained. The workmanship bestowed on the getting up of this machine is of the best kind, the arrangement of its various details is very simple, and altogether it appears a very desirable machine to be used on a central establishment for cleaning kupas in a cotton-growing district. The cleaned cotton from this machine in each of the three trials, had no appearance of being cut, or in any way injured by the cutting action of the saws, the staple seemed quite as long on careful examination, as that picked from the *kupas* by hand. The cotton was in every instance clean, unmixed with cut seeds or motes, the seed was well freed of all useful fibre. The experiment on Assam *kupas* may be considered as severe a test as the machine could be subjected to, yet the result was as satisfactory as regards the perfect separation of the cotton from the seed, as in the other trials.

18. Bates, Hyde and Co.'s Gin was worked by two men, who were relieved every five minutes; the labour was severe, and this, as well as "Carver's" gin is more adapted to be worked by steam-power than by manual labor. This machine is very compact and strong, simple in its detail; and of good workmanship. Its performance during the trials on the three kinds of *kupas* was quite as satisfactory as that of Carver's gin; the cotton and seed were in each case as clean, and the fibre did not appear cut. Your Committee are however of opinion that this gin, like the previous one, is far too large to be used as a "cottage gin," and could be worked to advantage only when put down in a central situation of a cotton growing district, along with a number of such like machines, to be turned by steam or other more convenient power; in which case it would be better if prepared with 50 to 70 saws, as is usual in America: it would then be a most complete, and a very desirable machine for the purpose.

19. Mr. Frost's machine performed its work tolerably well, but the cotton from it was not quite so well cleaned as that from the American machines, and more cotton was left upon the seed. It appears however, by reference to the right hand column of the table, that it did more work, in proportion to the number of feet of saw teeth engaged in cleaning a given quantity of cotton, than any of the other gins. This apparent advantage was most probably due to the small number of saws in this gin, which enabled the two men to drive it at full speed, causing less slip to the teeth through the cotton than in the larger gins. It is probable, too, that the saws being farther apart than in the American gins, each row of teeth would take up a larger quantity of cotton, although to the deterioration of the quality of the work performed. Indeed, in all the saw gins brought forward for competition upon the present occasion, and in a number of others now standing in the Society's rooms, and which have at various times been unsuccessfully tried for cleaning the cotton of this country, the arrangement is very nearly the same, the principal difference being in the hook of the saw teeth, and in the distance between the saws; and your Committee are of opinion that very little alteration would be required to make any one of these machines do the work in the same efficient manner as the American gins now competing. In saying this your Committee are far from wishing to detract in the least from the merit of the parties who have so successfully employed their talents in adapting the saw gin to the wants of this country. The alterations which have been effected, however small they may be in appearance, constitute the difference between a useless machine and an efficient one.

20. Mr. Mornay's churka was likewise tested on the three kinds of cotton: the following shews the result:—

Bombay kupas, ten tolas or one-eighth of a seer, cleaned in 2½ minutes.

Clean cotton, ..	.. 3 tolas,
Seed, ..	.. 7 „
	10 „

Madras kupas, ten tolas or one-eighth of a seer, cleaned in 2*m.* 43*s.*

Clean cotton, ..	.. 2¼ tolas,
Seed, ..	.. 7¾ „
	10 „

Assam kupas, ten tolas.

N.B. An attempt to clean the above description of cotton failed *in toto*.

It should be mentioned that the above three kinds of *kupas* were well opened out with the hand before they were placed on the feeder, and moreover, that the wheel was turned by two members of the Committee working alternately. The other machines were worked by coolies, and the *kupas* thrown promiscuously into the hopper.

The trials were very limited as to quantity, in consequence of the cotton requiring to be so well opened out by hand before it is put to the machine, and which is not necessary to be done for the saw gins; the great nicety and attention required to be paid to the feeding of this machine is more than could be expected from any native, and, in the absence of such close attention, the quantity got through would be very much reduced. The Madras and Bombay cotton was turned out quite clean, and the staple uninjured, but the machine entirely failed in the trial on Assam *kupas*; the rollers could not lay hold of the short staple. This machine would be far too costly and complicated to be used as a

"Cottage Churka" amongst the ryots. Mr. Mornay does not appear to have intended it for that purpose, but as a model of a larger machine to be used in a central cleaning establishment. It was, however, very apparent to your Committee, that to adapt it for the latter purpose, it would require its parts to be differently arranged, and much simplified; some additions would also require to be made to the feeding apparatus to ensure regularity of action. Your Committee do not consider there was sufficient in the model before them, to enable them to form an opinion, whether the machine could be so arranged on the large scale suggested by Mr. Mornay, to work with precision and economy: a separate machine would be required to open out the cotton before it could be put to this churka, and your Committee are not aware of any such machine being at present in use, or even invented.

21. In conclusion, your Committee beg to state that they find much difficulty in awarding to either of the American machines a degree of merit over the other. They, as well as Mr. Frost's machine, are by far too expensive to be used by the ryots as cottage machines, and your Committee would take this opportunity of expressing their opinion, that no machine made of wood or iron, either upon the churka or saw gin principle, can be produced, with any pretension to good workmanship, at a cost which could be afforded by a common ryot; and that to adopt any improved method of separating cotton from the seed, cleaning machinery on a sufficiently extensive scale must be established in central positions so as to meet the wants of the cotton growing districts, such machinery to be turned by steam or other power and placed under competent management. The gin sent out by Messrs. Carver and Co. in its present state, is the most complete and best adapted for that purpose, and next to this, Messrs. Bates, Hyde and Co.'s gin. At the same time, it is

only just to the latter gentlemen to observe, that had the Government advertisement stated that a machine adapted for a central establishment was the one wanted, their gin required nothing more than an addition of saws to make it equal to Messrs. Carver's machine. The Committee would add also, that there is sufficient evidence in the arrangement and workmanship of Mr. Frost's machine to shew them that there would be little difficulty in constructing a saw gin on a large scale, and well suited in every respect to clean the short staple cotton of India; and that such machines might be made in many of the Government or private workshops in this country. Your Committee would add, that they consider such machines very desirable, and if arrangements could be made to have them put down in convenient central situations in the cotton growing districts, they would produce cotton of a very superior degree of cleanliness, and in every respect (except length of staple) better suited to the wants of the home manufacturers than that sent forward in the present day. At the same time, your Committee beg respectfully to submit that, in their opinion, an improved quality of cotton, such as would compete with that imported into England from the American States, can only be attained in this country by holding out every reasonable inducement to the native growers to pay more attention to the cultivation, and by introducing to their notice a better description of seed. A remission of all, or a fair portion, of the land assessment, to such growers as produced an article equal to a fixed standard, would be a great inducement to the natives to attempt the attainment of so desirable an object; and when once gained, the increased demand and enhanced price of such cotton would very soon bring into cultivation large tracts of land which are at present productive of little revenue to the State; and thus in time make up to the Government any temporary loss by the remissions made in the first years of gradual improvement.

WILLIAM HAWORTH.
JOHN THOMSON.
JOHN WARD.
J. M. VOS.
F. G. SIDDONS.
T. F. HENLEY.

CALCUTTA,
February, 1853.

Communication from the Government of Bengal, announcing the award, by the Government of India, of the Prize of Rs. 5,000 *for the best Cotton-cleaning Machines.*

To *the Secretary Agricultural and Horticultural Society.*

Revenue Dept. SIR,—With reference to the Report of the Committee on Cotton-cleaning Machines, submitted to competition for the Government Prize of Rupees 5,000, received with your letter dated the 16th of March last, I am directed by the Most Noble the Governor of Bengal to forward the accompanying copy of a letter from the Officiating Under-Secretary to the Government of India, Home Department, No. 316 of the 29th ultimo, together with a Treasury order for Rupees 5,000, which sum should be made over by the Society to the two successful competitors in equal portions, as determined by the Government of India.

FORT WILLIAM:
5th *May,* 1853.

I have, &c.,
W. G. YOUNG.
Offg. Under-Secy. to the Govt. of Bengal.

To W. G. YOUNG, ESQ.,

Offg. Under-Secy. to the Govt. of Bengal.

Home Dept. Sir,—I am directed to acknowledge the receipt of your letter No. 278, dated the 29th ultimo, forwarding copy of a Report from the Agricultural and Horticultural Society on the working of the several Cotton-cleaning machines, which were submitted to competition for the prize of 5,000 Rupees offered by the Government of India, in 1849.

2. As the result of the experiments with the two machines, noticed in the margin, is considered satisfactory by the Society, and their respective merits are stated to be nearly evenly balanced, the Governor-General in Council is pleased to direct that the reward offered by the Government of India, be equally divided between the two leading competitors, Messrs. Bates, Hyde and Co., and Messrs. Carver and Co. of Massachusetts.

1. A saw-gin made by Messrs. Bates Hyde and Co. of Massachusetts.
2. A saw-gin made by Messrs. Carver and Co. of Massachusetts.

3rd A reference has been made to the Honorable the Lieutenant-Governor-North Western Provinces, with a view to ascertain whether the machines in question could be beneficially employed at Mirzapore, or elsewhere, by Government, as an experiment, in the manner proposed by the Committee.

COUNCIL CHAMBER : (Sd.) EDWARD THOMAS,
29th April, 1853. *Offg. Under-Secy. to the Govt. of India.*

To *the Secretary to the Agri-Horticultural Society.*

Revenue. SIR,—In continuation of the letter from this Office, No. 428, of the 16th instant, I am directed by the Most Noble the Governor of Bengal to forward, for the information of the Society, copy of a communication from the Secretary to the Government North-Western Provinces, dated the 14th instant, received with a Memorandum, No. 522, from the Officiating Under-Secretary to the Government of India, Home Department, dated the 23rd idem.

(Sd.) W. G. YOUNG.
Offg. Under-Secy. to the Govt. of Bengal.

FORT WILLIAM :
31*st May,* 1853.

To J. P. GRANT, ESQUIRE,
Secretary to the Govt. of India, Home Dept.,
FORT-WILLIAM.

Revenue Dept. SIR,—I am directed to acknowledge the receipt of Mr. Officiating Under-Secretary Thomas' letter, No. 335, dated the 29th ultimo, forwarding a report on the working of the Cotton-cleaning Machines, which were submitted to competition for the prize of Rupees 5,000, offered by the Government of India in 1849, and enquiring whether the machines in question could be beneficially employed at Mirzapore or elsewhere, by Government as an experiment.

2nd. The Lieutenant-Governor has directed me in reply to state that he has no facilities either at Agra or Mirzapore, for putting the engines to the test of experiment, as recommended by the Committee. His Honor regrets to say that since the death of Mr. Hamilton Bell in 1851, no one has come forward at Agra to maintain the efforts for the improvement of the Cotton staple, which that gentleman prosecuted with vigour till his last fatal illness.

(Signed) W. MUIR,
Secy. to the Govt., N. W. Provinces.

AGRA:
14th May, 1853.

[Since the receipt of the above letter; the Government of Bengal have forwarded to the Society copy of a communication from Mr. Claude H. Brown, to the Secretary to Government, N. W. P., intimating, with reference to the second paragraph of Mr. W. Muir's letter of the 14th May, 1853, that should the Lieut.-Governor be inclined to make over one or both of the prize Machines to his firm, (Messrs. Hamilton, Higginson and Co. of Mirzapore,) they would undertake to give them a fair trial at Culpee, and in the event of there being any good ground to look for a favorable result, they would test the value of the cotton so cleaned, both in the English and China markets. The Government of India having requested to be informed, with reference to the above offer, if one of the machines therein alluded to could be made available on payment of its cost price, for transmission to Culpee;—it was resolved by the General Meeting in August, when the correspondence was submitted, that it would be very inconvenient to allow models, of which the Society does not possesses duplicates, to be sent out of Calcutta, as such a practice might interfere with applications from other quarters; but that every facility be afforded Mr. Brown, for the manufacture of other machines similar to those now applied for. The Society has since been in correspondence with Messrs. Hamilton, Higginson and Co. on the subject.]

Further correspondence respecting the cultivation of New Granada Paddy in India.

I have seen, with regret, in Part 2, Vol. VIII, of the "Journal of the Agricultural and Horticultural Society of India," the failure of experiments made on the seed of hill rice sent by me from New Granada.

In Dr. Campbell's report on the trial made near Darjeeling, he states that as regards the second crop produced by this rice, he has found it to be quite a fallacy; and implies that there may be some mistake in the matter.

In explanation of which, I beg to repeat my assertion, that in the district of New Granada, from whence I procured the seed, the rice yields a second crop of *ripe grain* in one season; and even a third crop has been obtained, although not frequently: as the latter being less abundant, it is found generally more advantageous to crop it down by mules or cattle.

I presume the difference in the result arises from the climate; as in the Cordilleras the seasons must be less marked than in India; or indeed than I have found them to be on the low coast of New Granada itself, at a distance from the mountains. In proof of which, it is a fact, that in many of the mountainous districts of the interior, the sugar-cane is cut, and both molasses and sugar manufactured during the whole year, without any intermission.

Should a similar climate be found to exist in India, this rice must prove a valuable acquisition ; my attention having been especially drawn to its valuable property of producing an after-crop of ripe grain; which distinguishes it, from every description of South American marsh rice which has come under my observation.

W. JORDAN.

LIVERPOOL :
12th February, 1853.

A. H. BLECHYNDEN, ESQ.,
Secretary Agri-Horticultural Society.

My dear Sir,—In reply to your note of this morning accompanying one from Mr. Jordan of Liverpool respecting Dr. Campbell's experiments on the New Granada paddy at Darjeeling, I now beg to state, for the information of the Society, the result of some experiments I made at Cossipore on the same kind of seed.

I prepared in June last, two small patches of ground, on one of which I planted the *original* seed paddy received from Mr. Jordan, and in the other paddy raised from the same seed by Dr. Campbell. In the course of a few days the latter germinated freely; the original failed entirely, as well as some subsequent trials, after treating it with warm water, and ammonia, therefore I had to depend upon the Darjeeling seed, which grew most luxuriantly, until the very heavy rains set in, after which it gradually sickened and died away. On seeing signs of decay in this plot, I prepared a small mound of earth standing about six inches above the level of the garden, and placed the seed in it.

Around this I made a trench to carry off the rain water; the plants looked healthy for a time, but I thought they were still suffering from too much water, I then raised a mat on four supports, about four feet from the ground, which threw off the great weight of rain into the trench, but it did not prevent the plants obtaining sufficient light, air and moisture from the open sides. Under this treatment the plants recovered their healthy appearance, and grew very strong; towards the end of August they showed ears of grain, which increased quickly, and by the 15th September were ripe enough to cut. A sample of this first crop is marked No. 1. About the same time that the ears of grain began to form, I observed some new shoots springing up amidst and around each stool, these grew stronger than the first plant, and by the middle of October they had produced the ripe grain marked No. 2.—During the ripening of this second crop, a fresh batch of new shoots were springing up amongst the old roots, and rather to my surprise produced a third crop, which was ripe by the 20th November. The sample of this is marked No. 3. By this time a fourth set of new shoots had sprung up, but as the season advanced they looked poor and weak, yet they produced a fourth crop of grain dark in color, as well as poor in every respect. This I have marked No. 4. The plants gradually died off by the beginning of January. This experiment was on a very small scale, but it is so far valuable, as it shews that the natural character of the seed is to give more than one crop, as stated by Mr. Jordan; it has also shewn that the extra crops come from new shoots which make their appearance just as the previous crop is coming into ear.

CALCUTTA: WM. HAWORTH.
10th May, 1853.

Dr. Campbell, in a letter dated 21st June, 1853, applying for a further supply of this seed, with the view of giving it another trial, at a lower elevation than the former experiment was made, observes;—"I am satisfied that Mr. Haworth made a very careful examination of the Granada rice, grown by me here, as his supposition [see *Journal*, Vol. VIII., p. 86] regarding its unripeness when cut, was quite correct. I was obliged to cut it, although perfectly unripe, as it ceased to ripen from the coldness of the weather. It is on this account, as well as to ascertain if the rice maintains its distinguishing property of yielding three or more crops in one year, that I trouble you with this request for a fresh parcel of it."

On the applicability of the drying process to Sugar-cane, as an improved and economical method of producing Sugar.

By T. F. HENLEY, ESQ.

When I had the pleasure of addressing the Society last year on the subject of the applicability of the drying process to the Sugar-cane, as a probably economical method of manufacturing sugar;* it seemed desirable that an experiment should be made as to the keeping qualities of sugar-cane so prepared, and accordingly a quantity of the dried and powdered cane was set aside for the purpose.

I have now the pleasure to submit to the Society, a specimen of sugar manufactured from the above reserved portion of dried cane, after being kept thirteen months, without any extraordinary precautions to preserve the substance from the influence of the atmosphere, or at least not greater precautions than might be taken were the manufacture being carried on on a manufacturing scale of operations. The sample of sugar, it will be observed, is of a good strong grained quality indicating, as I observed during its manufacture, that but little deterioration had taken place during the long time the subject had been stored.

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* Mr. Henley's prior communication will be found at Page 1 of the present Vol.—EDS.

I would now recommend that the remaining portion of the specimen of dried cane be reserved for another year, for a similar experiment, and thus submit it to the severest practical test.

GOOSERY: 14*th May,* 1853.

Note on the comparative strength of "Jubbulpore Hemp," (Crotalaria tenuifolia), and other fibres. Communicated by MESSRS. W. H. HARTON AND CO.

To *the Secretary Agricultural and Horticultural Society.*

SIR,—Since communicating to you our observations on "Jubbulpore Hemp" (See *Journal,* Vol. viii., p. 113,) we have received the accompanying certificate of several kinds of rope tested at the Arsenal, Fort William, which you may perhaps think worthy of record.

8*th June,* 1853.

Report of several kinds of Rope, the manufacture of Messrs. W. H. Harton and Co. of Calcutta, tested in the Arsenal of Fort William, 3rd June, 1853.

Kind and quality of Rope.	Size.	Government Proof.			Breaking weight.		
	In.	Cwt.	qr.	lbs.	Cwt.	qr.	lbs.
Oiled Jubbulpore Hemp *(Crotalaria tenuifolia)* Artillery Traces,	3	36	0	0	43	2	0
Untarred do. Supr. Four. Strand Plain laid, ...	3¼	42	0	0	83	0	0
„ "Dunchee" *(Œschynomene canabina)* do. do. ..	3½	49	0	0	75	0	0
„ Pine Apple Fibre, do. do.	3¼	42	0	0	57	0	0

(Signed) J. WILKINS,
Officiating Prinl. Conductor,
REAR GODOWNS.

On the more extended application of Munjeet (Rubia Munjista Roxb:) to economical purposes. By T. F. Henley, Esq.

Will your submit on my part to the Society a specimen of Indian Garancine, manufactured from the Munjeet or Indian Madder.

Had time permitted ere my departure for Europe, it was my intention to have brought this subject prominently to the notice of the Society, as I am of opinion the substance in question contains the necessary conditions for becoming a most valuable staple product of export from this country.

The Munjeet I have found to yield, when submitted to similar processes, all the different products obtainable from the Madder of Europe. Such as the substance as above called Garancine, or the colouring matter of the plant simply mixed or combined with carbonized vegetable matter, and obtained by mixing gradually an equal weight of concentrated sulphuric acid on *powdered* Munjeet or Madder—and then by washing out slowly the acid with cold water. The process requires considerable care and management to prevent too great heating of the materials, and in my small operations, the vessels were kept plunged in cold water during the operation. The advantages presented by the substance in question or Garancine, as regards this country, are very great indeed, as it would obviate in a great measure the objection which now exists, and prevents a much more extensive commerce than obtains at present in Munjeet, arising from its bulky nature, increasing the charge of freight to such an extent as to render its export almost *nil.* All the coloring matter of four tons of Munjeet, as at present packed, may be packed in the space of one ton, although in point of actual weight, it may be estimated that three tons of Munjeet produce one ton of Garancine. By the manufacturer, Madder, in the form of Garancine, is preferred for several reasons, and the greater portion of French Madders are now converted into Garancine for the purposes of the dyer. The extent and value of the commerce are of the highest importance.

It was my intention to have suggested to the Society that every effort should be made to obtain from France, at any reasonable expense, the fullest practical information on the subject of the Garancine manufacture on the large scale, commencing with the best processes for grinding the root to powder, with the observations of some competent person, as to such modifications as might be necessary for rendering similar machinery available for grinding our Indian Munjeet. This point will require intelligent consideration. In my experiments, I found the reduction of such a tough and fibrous matter as Munjeet to a coarse powder a matter of great difficulty. The method of employing the acid also on a large scale, so as to obviate destructive heating, the recovery of the acid, processes of drying, powdering, &c., all forming an agricultural manufacture, quite within the sphere of our Society's objects, and one offering such a prospect of value to the commerce of the country that I can hardly think any reasonable amount of funds or trouble should be spared in the effort to introduce the art. It will, moreover, be found that such a manufacture is peculiarly well suited to the country. If once successfully introduced, the immense extent of country throughout which the Munjeet climber is to be found in this country, both in a wild and cultivated state, the cheapness at which it can be produced, and the valuable colouring matter which it contains, (perhaps the most valuable dye in existence, the Madder Red,) all point to the importance of the subject.

I have also obtained the substance called Alizarine, or the pure red coloring matter of Madder, from the Munjeet, and it was my intention to have presented the Society with a specimen of it also. Time however, on the eve of my departure for England, has prevented my carrying out that intention.

When in Europe, should occasion present itself, or my means permit, I shall continue my inquiries on this important subject, and be happy to offer any acquired information to the Society.

ON BOARD THE "BOMBAY" SCREW STEAMER,
NEAR KEDGEREE: 17*th June*, 1853.

Remarks on the growth of Indigenous Cotton, and on the economical use of the stalk of the Flax plant in Upper India. By C. GUBBINS, ESQ., *with a report by* J. COWELL, ESQ., *on the musters submitted.*

You may perhaps remember, that about two years ago, I sent you specimens of cotton raised at Meerut, from common native seed, both of the first and second year's crop, and the opinion given by the Cotton Committee, favored my previously conceived idea, that a better quality of cotton was produced from the same plant, at a more advanced state of maturity.

My departure to the Cape in ill health interrupted the progress of the experiment, for though I had given special directions on the subject, the third year's crop was not preserved; and on my return I could only procure a very small quantity of the fourth year's, being the contents of a few late pods that were still hanging on the plants at the very end of February. It may be worthy of notice, that the plants themselves were still flourishing, although many other kinds near them had perished from the neglect they had experienced during my absence, a proof that the common native cotton of these provinces belongs originally to the long lived variety, although by custom restricted to one year's growth.

Before my departure I had sown a little seed of the second year's produce, and on my return, I found these plants in full bearing for the second time. I send (marked B) a specimen of their produce, separated from the seed by the common native churka: and to facilitate the formation of an opinion on its quality, I add an equal quantity (marked A) of the best kind of cotton grown in these parts, first year's crop.

I add a quantity of seed of this second year's growth for the use of any member of the Society who may be desirous of carrying on the experiment. I have retained a portion, and shall now sow it at this place, beside an equal-sized plot sown with common bazaar seed, to ascertain whether there be any difference in period of ripening, or quantity of produce. I think I perceive that the seed is greener, and more fuzzy than the stock it sprung from, which is universally black and naked.

I forward also a small ball of twine which I have had manufactured in the bazaar from the refuse stalks of the "Ulsee" *(Linum usitatissimum.)* This plant is very generally sown as a cold weather crop in these provinces; but the seed alone being used, the plants are allowed to stand far apart and have plenty of room to spread; the stalks being considered valueless are trampled or eaten down by cattle. Under such circumstances the fibre will of course be of inferior quality, but still applicable to many purposes; and to show the people what could be done, with this "refuse" of their fields, I had a few bundles of stalks steeped in water, in a common earthenware pan, exposed to the full sunshine of May, until the fibre could be readily separated by hand. It was then dried in the open air, and the twine made by a common village workman, in his own fashion, is decidedly superior, in smoothness and regularity, to what he is in the habit of making from the *Hibiscus cannabinus.*

Doubtless a much better result might be obtained from plants sown closer together, and especially from the improved method of wetting the stalks in hot water: but I preferred incurring no expense, and adopting no new process, as my chief object was to point out to the natives a profitable mode of employing a portion of the produce of their present cultivation, which they have hitherto considered as useless.

I remain, &c.,

BIJNORÉ : CHAS. GUBBINS.

1*st July*, 1853.

I have examined the samples of indigenous cotton which you sent me on the 23rd instant. I cannot perceive any material difference between the sample of 1851 and 1853, the latter is perhaps a little finer, and longer of fibre. Both are fair specimens of cotton from native seed.

The twine is a very good and useful article. It is *strong*, *soft*, and *pliant*,—three qualities required.

With a better twist it would be well suited for the Australian markets, where it would sell largely at remunerative prices; if Mr. Gubbins could induce the natives to make this twine from the flax or linseed plant he would be conferring a great benefit on them. The value in this market may be quoted at Rs. 14 @ 15 per maund of 84 ℔ English.

I return the musters of twine and cotton herewith.

I omitted to tell you that the twine was shown to a ship-chandler, and he values it highly. He pronounced it to be of English manufacture and twist, until he was undeceived. I consider it worth fully 15 Rs. per maund, perhaps 16 Rs., and Mr. Gubbins would find a large sale for it here for the Australian markets.

I would take off myself for these Colonies a goodly quantity. All that is required is to make the twine of a better twist, and there cannot then exist a doubt of its ready sale at profitable prices, say 17 @ 18 per maund.

The twine should be made of different sizes, if possible. What you showed me is suitable for *sail* twine.

CALCUTTA : JAMES COWELL.

30*th August*, 1853.

Notice respecting the Vegetable Wax-tree of the Cape of Good Hope, (Myrica cerifera.) By Capt. C. E. Burton, *Political Agent, Kotah.*

Dear Sir,—I have dispatched, by banghy dâk, to your address, a small sample of vegetable wax, and a few berries* of the shrub, which I brought with me from the Cape of Good Hope. It grows wild and luxuriantly in several parts of the Colony, and is extensively used by the Boors, as candles. The wax is rubbed off from the surface of the berry by hand, but if boiled it would most likely yield a more plentiful supply. It grows in abundance on the Flats, the lands between Simon's and Table Bays, on a sandy soil. The specimen sent was exhibited at the Cape Town Agricultural Meeting last year, and candles prepared from it were reported favourably of by the Committee. It was refined by a person named Finn, I believe, and it was said he could prepare large quantities at a very low rate—at 3*d.* per ℔, if my memory serves me; but if required I shall be happy to obtain every information which may be desired by your Society.

Kotah :
1st July, 1853.

Believe me, &c.,
Charles Burton.

Notice regarding the culture of Exotic Cotton in the Punjab. Communicated by James Prinsep, Esq., *Assistant-Commissioner, Buttala.*

The cotton seed you were kind enough to send me has been pretty well distributed among Zemindars; in fact all has been sown almost, and what I have springing up in my nursery grounds is extremely healthy. I find the fresh imported seed does not come up so freely or quickly as those of one or two years' acclimated growth. Of the latter I have some from plants I grew at Sealkote last year. On shewing both kinds ,to the Zemindars, and the cotton produced from them, they were much pleased. The quality of the cotton is so far superior to that of the common country kind, the softness and whiteness so fine, that I feel assured the people will be glad to cultivate the American kind. There is only one cause for doubt to its having as general cultivation. We know how averse natives are to trying anything new,—the limited means of the agricultural portion will not admit of it; should the crop fail, the loss falls very heavily on them.

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* Some seeds of this shrub (*Myrica cerifera*) were presented to the Society by Mr. C. Gubbins in February, 1853, and have germinated readily in its garden.—Eds.

The newly imported seed apparently loses its vigour in transit from its native country, and by the time it reaches these parts about ⅓ has dried u, judging from the relative growth of the two kinds I have in my garden. I sowed about 3 kanals of land (or ¾ of a beegah,) with Pettigulph and Sea Island cotton, received from you about August or September last, in the proportion of one of the latter to three of the former. About 7 or 10 days subsequently, was sown in another bit of ground, of the same size and kind exactly, one year's acclimated Pettigulph seed obtained from my Sealkote crop, and though the latter sprung up after the former, it has almost outstripped the former in growth, and certainly in quantity, nearly every seed taking root, whilst the new seed is to be seen only few and far between. To the toiling Zemindar this would not be a profitable speculation to indulge in, though doubtless the quality of the cotton, which is known by the name of "Narma," is very superior. I shall be glad to receive as much as you can spare me again this year for general distribution. By having plantations of my own, not only does it afford an encouragement to the people, by witnessing with their own eyes the good description of cotton that it is my object to introduce among them, but I have a fresh stock of the better kind of seed for distribution.

It was my intention to have given you an account of my first effort to grow American cotton. This I would gladly have done had I not been called away from Sealkote, after having seen all my cotton-seeds planted at distances of about 2 feet a part, and the seeds themselves mostly well out of the ground. All I can now tell you is that on the 15th April, 1852, I sowed some Pettigulph seed obtained from Capt. Burnett, which germinated on the sixth day, and soon after some Sea Island cotton which showed itself in five days above ground.

The same amount of watering was given to both as to the native kind, and out of about 5½ kanals of the former (Pettigulph,) somewhere (at a rough guess) near 46 seers of cotton were obtained in December last. I cannot give more than an approximation to the total produce, having been absent throughout the whole period of its growth. Nor do I know the real amount of attention paid to its cultivation. The Sea Island kind was not ripe for picking when I was at Sealkote in December, the pods, though abundant, seemed to yield little or nothing.

I hope however to be able to give you a happier account of my this year's exertions after the next cotton harvest.

I have despatched by to-day's dawk a sample of about ½ a seer of the Sealkote grown Pettigulph cotton, together with a couple of yards of cloth woven from it by the prisoners of this Jail, for the inspection of any that may like to see it, and if you think it is worth submitting to the Committee, you are perfectly welcome to do so. The cloth is not of *first rate(!)* texture, but considering it is the first of the kind yet woven from American cotton up hereabouts, it may be interesting to look at, and has certainly I think a claim to preference over the common country "garha" cloth.

I ought to tell you that the sample now sent has only received one washing.

BUTTALA: *22nd May*, 1853.

MY DEAR SIR,—I have received your note, and the samples of Punjaubee grown cotton and made cloth. The cotton appears to me to be from American stock, it is pretty fair in staple and soft, but adheres tenaciously to the seed, as all these short varieties do. It is a useful fibre, but what we want to know is the cost per maund. The cloth made, I suppose, from this cotton, is good of its kind, being strong, though the texture is not even, and the weaving somewhat imperfect, as might be expected from inexperienced hands. It is I reckon superior however to the common country cloths called "Gurrahs," and if it could be made reasonably, would find a ready and extensive sale in all the markets of Bengal, particularly for Indigo and packing purposes.

CALCUTTA: Yours truly,
11*th June*, 1853. JAMES COWELL.

Hints for the Raising of Anemones and Ranunculuses. By MR. J. MCMURRAY, *Head Gardener of the Society.*

[Mr. McMurray having been very successful in growing Anemones and Ranunculuses during the cold season of 1852-53, was requested to furnish a brief memorandum on the subject, which is now published for the information of amateur florists.]

The Ranunculus and Anemone tubers, grown in the Society's Garden, were planted out on the 18th Nov., 1852, in four feet beds prepared for them in the open ground. After the beds had been marked off, eighteen inches of the surface soil was dug out, and a compost introduced in its stead to that depth, consisting of two parts well decomposed leaf mould, one of peat, one of good cow manure in a rotten state, and one of rough river sand, the whole being well mixed together previous to using. Six inches beneath the compost, three pipes made of bamboos were inserted in each bed, which reached from one end of the bed to the other, for the purpose of conveying water to the roots. independent of what was given from above. These pipes were made of the largest sized bamboos procurable, and previous to using were split through the centre, and the knots cut out of the heart; the two sides were then laid together, and the above number inserted at equal distances from each other, observing at the same time to lay them down in a gentle sloping position, so as to allow of a fall, and also the uppermost end open for the reception of the water, which oozes out of both sides into the bed, without being choked up with the soil. The beds were then levelled, and slightly pressed down with the back of the spade, lines were then marked off six inches every way for the Ranunculus, and twelve inches for the Anemones, holes being then made two inches deep with a blunt ended dibble, and in each hole a small quantity of sand scattered, and the tubers planted, after which the beds were levelled, and neatly raked. No water was applied until the plants had made their appearance above ground; at that time it was given liberally through the pipes, with the addition of a temporary shading from half-past ten in the morning until half-past three in the evening. As the days advanced in length and the sun in strength, the shading was put on earlier in the morning, and retained on later in the evening, and the water more copiously supplied through the pipes; in addition to which water was given once a week from above, until the middle of February, when it was given every other day from both above and below.

J. McMurray.

25th April, 1853.

On the Natural Productions of the Vale of Kashmere. By *Lt.* W. H. Lowther, 52*nd Regt. N. I.*

I have now the pleasure to forward my long promised sketch of the Natural Productions, (especially of the Vegetable World,) observed in a late tour of five months' duration through the territories of Maharajah Gulab Singh, extending from Bimhur in the Punjab, to the famous valley of Kashmere, and thence backwards by the Buramūluk route. I must premise by stating that I had offered my services *gratis* to Government as a collector of botanical specimens, as a general explorer in the wide field which has lately been thrown open to enquiry since the annexation of the vast Sikh empire, but as no reply was ever made to the application, I am quite at a loss to conjecture how such an economical measure could have met with discouragement,—or rather neglect, from the Higher Powers. I was thus left to my own resources, to a very limited period of travel and observation. Accordingly I started from Ferozepore about the [illegible] of April, and managed to reach Bimhur in a few days. A [illegible] dirty depopulated remnant of a town cannot well be [illegible]: the surrounding country very bleak, uninteresting; a considerable torrent passes through the place; its waters seem to irrigate the fields of rice, wheat, and bajerow which extend along its banks. There is a shady grove of mulberry, lime, and other fruit trees, at the travellers' bungalow, but this seems the only attempt at a garden in the vicinity. Ridges of low rocky hills (or rather heaps of stones) finish the uninviting landscape, if we may except a busy water mill of the usually primitive model, which industriously grinds in the service of the miser monarch. There is a considerable traffic however, in spite of appearances; the traveller meets Bunjarra bullocks and camels in whole armies of thousands, laden with the richer produce of the higher regions, or bound ubiquitously on the errand of trade. As the footsteps recede from the plains, so does all vestige of a highway: not *one coss* from the town a guide is necessary, for there the path enters the fickle torrent, and meanders invisibly in an alternate labyrinth of tall oleanders, grass, and rocks, and should the clouds lower, a rapid flood advances to cut off all communication in front, and rear,—perhaps for *whole hours*! After a zig-zag walk, alternately wet, or dry, of some miles in length, the foot of a naturally scarped mountain is reached,—that great outwork which would form the first serious barrier to an invader. The ascent is dreadfully abrupt, an inclined plane of slippery sandstone, sometimes of many *hundred yards* extent, considerably angmenting the danger or difficulty of the journey. I observed that the Bunjarras usually halted half way across, or regaled their panting quadrupeds with the rich pasturage on its slopes, giving them thereby a night's rest to recruit their failing strength for the remaining portion of the task. At the summit is a rude tower and breast-work occupied by a few soldiers. The thickets through which the path winds are very dense, and consist mostly of *Dodonœa, Acacias*, Pines, *Korounda*, and many common jungle trees,—many blossoming shrubs, as *Dalbergias*, &c., but not a single flower of any kind, which fact is accounted for in the scarcity of water, one small spring of which is alone met with *en route*.

The descent is equally abrupt, at many points *climbing* would be an expressive term: it appeared to me a wonderful feature of animal endurance, how bullocks and tattoos, under their respective loads of 2 or 300 lbs. each, managed to scale these almost perpendicular heights. On reaching the little vale below, the same torrent again presents itself, but of larger growth,—deep pools of pellucid water sparkle among green banks, and the rocks are of bolder form. A richly cultivated tract, alternately clothed with wheat, and bajerow stretches far away to the hamlet, and (next) stage of Sadabad, where the ruins of a magnificent serai silently speak of ancient Mohammedanism, and its pompous luxuries. The customs chokies of the modern tyrant, here exercise a lynx-eyed control on all errant purveyors; every thing, and every body, are here taxed *ad valorem*, from the obese bunyah with his precious kafilah of silks, saffron, and spices, to the pauper widow eking out her last pice. Quitting Sadabad the prospect improves,—the very air seems different, as clearer or colder it murmurs Æolian sighs through the fragrant pine leaves,—and the grass is greener than the eye has lately seen. Winding among mountains the pathway suddenly emerges on another happy valley,—Noushera: the town is situated on the Tohee, a roughly picturesque stream, reminding me of many such a one in old England. I saw a great mass of timber being floated down, and was informed that Gulab Singh derived a large local profit on this commodity. The gardens (or rather orchards) are numerous, and kept in very good order. I observed in them trees of vines, plums, apricots and plantains: there were some fields of very inferior tobacco, some fine wheat, and pigeon peas, and in a flower plot some gay clumps of narcissus. Maize is grown largely in the season. There is a large bazaar, and a considerable trade carried on with Jummoo and the plains. The place is considered of importance, is in the jagheer of Jowahir Singh (Gulab's nephew) and garrisoned by a large portion of his troops, who are extremely arrogant, and disrespectful to strangers. Salt appears to be the principal article of merchandize, and it is brought on bullocks and tattoos from the interior. Visible across the river on the heights is a strong fortlet, said to contain many guns, and a garrison. A very rocky, narrow thoroughfare runs along the right bank, sometimes it penetrates a thorny wilderness, and sometimes it traverses the uncouth boulders: the river roars, and rushes, with great violence through the narrow portions of its channel, amid the rocks: on the humid knolls in its vicinity many beautiful plants and shrubs present themselves, which never having seen before I cannot name; their character that of under shrubs, with (mostly) blue, or azure blossoms;—a giant creeper was very superb, apparently one of the *Leguminosæ*, stem 2 or 3 inches circumference, the blossom an immense bunch of papilionaceous flowers,—sky-blue, and white. The Gloriosa lily everywhere entwined itself in great luxuriance, and many showy shrubs of the larger sorts contributed to adorn the jungle; especially one which appears to be a *Pittosporum.* A scattered hamlet, with its few maize fields is here the only symbol of civilization, all else consists in a ruined serai, and an interminable jungle, which alone needs the fostering hand of Britain to convert into a fertile garden. Water power seems everywhere absolutely wasted; beyond the feeble machine rudely raised from logs and stones for the preparation of the household meal, no sort of mill exists, and yet no valleys in the world contain greater facilities for their use, or one would suppose greater inducements for mechanical improvement; the fault, or rather crime, lies with the present sordid ruler, and his myrmidons. The soil on the rude terraces appeared of the richest description, a black, boggy mould, which produced as fine heads of maize as I ever saw in India. The green slopes around them were rich in gaily hued flowers and shrubs. Among the former I noticed *Campanulas* and the gaudy *Hibiscus (ferox?)* its brilliant yellow masses visible at a great distance. I noticed *Xanthoxylum hostile* (vern: Tez-bull) two species "Semalho," the *Catechu* and other *Acacias;* and on a ruin discovered a trailing plant, with clusters of delicate white bloom, fragrant of honey. At the same spot, in front of a dilapidated arch, were a few friendless trees of peach, pear, pomegranite, the degenerate progeny of some imperial palace-yard. Minadpore is a large village through which we will pass at once to Rajowree, a considerable town, 5 miles further on, merely remarking of the pathway, that it winds through thorny brakes, across brooks, over sheets of maize, or rice, and that the latter part of it is a steep ascent of the nearly perpendicular hill, over hanging the military post of "Rajowree," the nominal Lord of which is "Meer Huttoo,"—a natural son of Gulab Singh. His jagheer is said to bring in about one lakh of rupees annually, and to judge by the display of the precious metals on the persons of the inhabitants, I should say *could* produce more. They are almost entirely Hindoos of the Buneea caste, very industrious and speculative, and enjoying comparative immunity from extortion and oppression, in consequence of their religion. The elevation above the sea may be 4 or 5000 feet, but the heat of the air is at times quite insupportable, the closely built houses being environed on all sides by precipitous ranges of lofty hills, densely wooded to their very summits: that, over which the narrow defile winds in approaching the town, is an impenetrable jungle of low thorny woodland, which appears to be strictly retained as a useful barrier of defence against external foes. Below the walls, along either bank of the Tohee, are many neat enclosures filled with vines, plantains, and other choice fruit trees. Crossing the rapid, or dangerous ford, the traveller will encamp in the ruined pleasure gardens of the magnificent Moslems. On all sides he beholds the relics of their opulent extravagance. Porches and fountains, reservoirs, terraces, and walls, all sinking into the dust; but outliving *them*, stand many noble objects of the vegetable world, plane trees of immense girth, two large *Chumpas*, and a choice collection of fruits. There is quite a wilderness of the *Rosa semperflorens*, interspersed with chrysanthemums, jonquills, and the yellow iris. Amidst this wreck of things, I found a fine climbing rose, of the sort known by the native name "kuja," the flowers were unusually large, and sweet, and the tree itself must have been of great age, to judge by its size and height. There is no gardener, but a man is occasionally sent to turn on a water course, in very dry weather. All the low grounds and valleys are tilled for rice; directly the snow melts (the ground having been previously ploughed,) is submitted to inundation, or planted with paddy. Great is the sickness arising from this necessary evil; to migrate or to die is the option of all the Kashmerians who dwell in the neighbourhood: accordingly by the end of May, these men and their families decamp for the higher mountains, where they erect log huts, and eke out their summer existence between sleep or starvation. The town's people appeared to suffer severely from ague and marsh fever, but affected to look on the evil as an unavoidable occurrence. The winters are said to be very severe; snow often lies on the ground three or four feet deep, though not for any length of time. July and August are terrible months for heat, and consequently malaria. The paddy being then in the fulness of its growth, every sort of venomous reptile abounds; snakes, centipedes, and scorpions, all treated me to their company during a brief sojourn in canvas. Early in May there was a succession of furious hail-storms, the *quantity* of stones which fell surpassed all previous experience, and destroyed every fruit for miles around: but the most singular mischief was that inflicted on the finny race, hundreds of dead mahseer, and eels were cast by the flood on the shore, killed, as I was told, by *swallowing the hail-stones as food!* I recollect a similar occurrence some years ago in the Jullundur Dooab.

The uplands are covered with fine grazing pasture, and Gulab Singh avails himself of this circumstance by keeping a great number of horses and mules in the district to consume it: the former appeared very superior animals, a cross between Yaboo and Arab and Northern horses. Sheep appeared poor and scarce, goats seeming to be the favourite stock of the butcher. Most of the specimens of horned cattle I saw were of the meanest species, being used only for the plough; occasionally indeed a milch buffalo was met with of a fair size and breed. Englishmen would completely change the "dustoor" here, that "dustoor" meaning (Anglice) "doing nothing." Nobody builds a bridge over the fords, though a man or two are drowned in the rainy season daily, because nobody cares, or nobody knows how, or nobody gives the hookum, and that with logs and rocks, and lime under their feet, and thus to the end of the chapter!

Leaving this Gothic capital, at the risk of transmitting his sliding limbs into some distant cavern of the "Tohee," the *Viator* emerges, dripping like a merman, on his 12th mile trip to Thannah, the next stage, an amphibious journey he may call it, wading through the paddy and lanes turned *pro tem* into canals.

On an occasional mound strange vegetation strikes the eye. No longer the tropical plantain bends in the breeze. At Berode, a picturesque hamlet, limes and chestnuts cast their proud shade on the turf, and in the hedges the elegant *Spiræa* flourishes, and on the moist brink of a spring the large *Orchis* blooms, and bright mosses sparkle in the sunlight. I noticed a delicate trailer, a species of *Petunia*, pale lilac colour; a climbing bean, with a pretty pink scented blossom; a small creeper with bright yellow racemes, like miniature laburnum, *Glycine* (?), and obtained two or three bulbs of a *Crinum*. By a small stream near the traveller's room, two or three showy plants of balsam were flourishing, and with their countless parti-coloured flowers added to the gaiety of this natural garden. As we ascend the Ruttun Pir mountain, (estimated by Hugel at 9,000 feet,) the scenery and climate attain the happiest scale of effect, the former magnificent from its boundless extent, the latter temperately invigorating, delighting the body. Of all the eligible sites, possessing adequate facilities for a military sanatarium, this one appears to me to bear the palm; and should events lead to British dominion, I think this favoured spot will be universally popular. Oaks, chestnuts, limes, elms, yews, ash, box and many other forest trees of useful quality, clothe the lower ridges, and these are interspersed with every description of ornamental shrub and plant. I especially noticed *Rhododendron,* and two species of *Clematis, Spiræa, Salvias,* Viola, and two or three delicate flowers quite unknown to me. Nearer the summit, large pines and firs constitute the woodland, and the choicer offspring of cold regions flourish in abundance. I noticed two fine species of *Azalea, Vaccinium, Iris, Potentillas, Primulas,* lavender, and fine patches of the pretty alpine *Auricula,* unusually large, and perfect. The shrine of a fakeer, and two or three sheds for travellers, occupy nearly all the table land on the peak. Thence we descend to the next stage,—a large village called Perhamgala, from the river on which it is situated, and which is crossed by a temporary bridge of pine-wood. The icy foam of the swollen current lashes the rocks furiously, and a slight fall of rain, or sudden thaw, adds tremendously to its power, when down comes the rude invention, and the thoroughfare is closed *pro tem.* I noticed many beautifully coloured orchids, and lichens, in the damp crevices of the boulders, but was unsuccessful in my search of *Lilium giganteum,* described by Hugel as growing in this locality. I saw several specimens of that interesting bird, the "water ousel," which was diving unharmed among mighty cataracts, which would have hurled to speedy and certain destruction any adventurous elephant! I saw both cherry and walnut trees here, and a few plots of greens. The wretched denizens of this village had just arrived on their summer sojourn, (for here, in the winter, snow often falls to the depth of 100 feet); they seemed as apathetic, lazy, and dirty as any people in creation; the talisman "bukshish" seemed to lose its spell over *them* altogether. A shikarree and a blacksmith appeared to be the only active agents of the community; the latter executed some repairs for me in a workmanlike manner, at a cheap rate. Leaving this unpromising colony, the road winds through a narrow pass or gorge, along which flows the almost freezing current of the Dam-Dam river, over which (if memory serves me right), twenty-three bridges of the frail description above alluded to are thrown. This stage therefore really deserves to be called dangerous. The only object of interest to be seen during the many tedious miles is a noble cascade, graceful in its descent, and which in Hugel's opinion, "would have attracted many a traveller in Europe from a great distance, to admire this so magnificent a scene." The sides of this gorge are very deficient in foliage, but the heights are crowned with fine trees. I observed frequent traces of mineralogical deposits on the face of the perpendicular walls of rock,—especially those of copper and iron. The chestnut still continued to be the main ornament of the glens, and appeared to be the favourite retreats of the gungoor, (or "black-faced monkey"), large troops of which were feeding on the fallen nuts. Passing through another pauper hamlet called Dubran, a rugged path leads to Porchajanah, the halting place at the foot of the famous Pir Punjal mountains. The same squalid misery frowns on the new comer, idleness and rags, and filth and starvation, all flourishing in the midst of green slopes, and an ultra rich soil, strange anomalies to all but eastern politicians! As might be anticipated, the unwilling labourers brought on from the last-mentioned stage, and all the able-bodied ones in this, decamped,—food, money, and commiseration not having sufficient charms to attract. Thus a host of travellers were deposited midway to the "Happy Valley," and left to the ingenuity of their own resources for progression. During this unavoidable delay, I prepared a plot of ground in the neighbourhood of a cottage, the needy inmates of which (an old woman and two boys,) assisted me in clearing of stones and weeds. Here I planted a few rows of potatoes, and seeds of nearly all the European kinds of vegetables and flowers I possessed; and, after describing to the owners what an addition would accrue to their daily fare, if they attended to the garden, I committed it to their care; but not having since seen it, or visited the village, I cannot say what success attended my endeavours.

The climate, as might be expected at such an elevation, is variable, a capricious moisture however predominates, rain, and sleet are perpetually falling, and murky clouds envelope the face of nature in wet mists. On the heights above the Surai are many lofty mounds, clad in bright green coverings of rich grasses, intermixed with richly hued tufts of iris, balsams, auriculas, &c.

It was on the 13th of May, that I left this inhospitable spot, and in a pelting storm of sleet, hail. and rain, ascended that formidable barrier which gives its name to the entire chain,—the Pir Punjal Pass, on nearing which the elements underwent a vivid change. Snow lay deep enough to bury the torrents and pine forests, and was falling unceasingly to be swept by the icy wind into congealed masses: while the pinnacles of these austere peaks were shrouded in a sombre veil of dense vapour. A raven wheeled ominously in mid air over a dark spot on the white surface, which proved to be a corpse, one of a party of natives who had been struck by the icy shafts of an eastern winter, and was already partially entombed by its severity. This sudden apparition instilled fresh terrors into the already half-dead frames of my exhausted Hindustanees, and the sturdy highland coolies, weary with their burdens, had now the additional labour imposed on them of pulling up some of these sufferers to the summit, in gaining which one false step would have precipitated both to their yawning graves. A gurhi, or tower, commands the approach, and here a detachment of the Maharajah's troops take post directly the pass is open, to prevent the egress of any of his subjects, unprovided with a passport; hence a pathway over nearly level ground, (or rather over *snow*) leads to the lone Serai of

Alliabad, the only tenants of which, two bunneas,' are sent by the Maharajah to supply the inner man with necessaries. The traveller has here the option of bivouacking in the open snow, or of putting up in a ruined cell with no window, and no chimney. The vigorous climate made me choose the latter alternative, but refreshment in such swinish quarters was almost unattainable, with smoke, puddles, old litter, noise, and vermin, all at one's immediate nostrils! The view outside was sublimely magnificent, mountains classically heaped on mountains, "Ossa on Pelion." Snow and sky composed the wild landscape, for vegetation was almost entirely; buried the birch and elm, however occasionally rose in the light of heaven, the former seemed the especially "good genius" of these dreary regions. Its bark was strewed unsparingly around, and with this substance man, in these inclement climes, has formed a snug water-tight covering for his habitation; the roof is first lightly constructed of light spars and thin deal planks, over these are put several layers of the said material, and again over them are nailed with wooden pegs another tier of stouter boards. Sometimes by way of additional security from wind and storm, pieces of rock are roughly heaped here and there, rude but nevertheless efficacious means of protection. Great quantities of this product (bark) are annually sent into the vale of Kashmere, where besides being used for roofing, it is largely employed as a wrapper for goods, fruit, and grocery, and appears to have been anciently used in all parts for manuscripts, before the discovery of paper, "*liber*" being synonomous for "bark," or a "book." It is not unreasonable to imagine that it was generally used for writing in the countries which produced it, as "papyrus" was in Egypt and Assyria. Besides, it is a very pleasant article, over which the pen glides freely, and moreover is very lasting and tenacious when properly prepared. Near a warm spring close under the serai I saw a fine bed of ranunculus,—some primula and mosses, but these were the only green things in existence. I was informed that about six weeks later (after the thaw has finished), these heights become an extensive park of verdure, strewed with rare and fine flowers of every shade. Herds of cattle and tattoos are then sent up to graze, and remain there till the yellow autumn reminds their keepers that winter's snows are again approaching.

There are many steep descents and toilsome paths, occasionally changing from rugged to dangerous, during the next long stage of 10 coss to Hirpoor: especially one portion, where a rude barrier of timber or stones has been hastily thrown up on the edge of a fearful precipice, regarding which there is many a strange legend and bloody tale. In ancient times there were robber hordes here too, who lived by levying black mail on travellers, and the scenes of their exploits, or the ruins of their strongholds, furnish abundant food for Kashmeree loquacity *en route*. The last six miles or so of the road lies through strikingly picturesque scenery, mountain and dell, highland, and glen in pleasing proximity. The fir forests crown the slopes in majestic growth, and sparkling rivulets, mingling with roaring torrents, harmoniously blend in the perspective. Animal and vegetable life too are happily viewed together, the blackbird, and waterousel are warbling in the sunshine,—the pheasant and chikore whir into the thicket,—the startled musk deer gazes distantly on the intruder, and the unexpected woodcock rises from the rill at the road side; sweet perfumes from trees, or bushes ravish the senses, and many a flowery gem waves in the air,—the wild crocus, the drooping lily *(Gool Zambuc,)* the violet, anemones, ranunculus, primula, tulips, orchis, clematis, and many unknown rarities, are profusely scattered over the turf. There are numerous patches of brushwood, intersected with rivulets, (the winter haunts of the woodcock), and along the margin of these grow tangled beds of the pretty *Parnassia.* The thaw has commenced, and slippery is the footing. The old wooden structure of Hirpoor, in spite of its thickly-laid coating of birch bark, looks mouldy and uninviting:—huge fungi (the heralds of decay) brood over the portals, within which damp darkness holds uninviting reign.

Gulab Singh's granaries are however *new,* and *in capital trim,* as leakage would cost the carpenters their ears, (perhaps *noses* too), neglect has been carefully avoided, and these erections appeared to me the only habitable tenements I had yet encountered. I shared an empty one with a fellow-traveller, who pronounced it an "enviable retreat." They are all raised on low pillars of stone, and are annually stored with provisions, which are retailed at considerable profit to troops, travellers, &c. I noticed some fine walnut trees, and a few scattered huts, which are inhabited in the summer by cultivators. Everywhere I saw excellent pasturage lands, which in the season furnish heavy crops of maize; mustard is also much grown for the sake of the oil. The famous "Vale of Kashmere" is entered at the dirty town of Shupeyon, in approaching which the eye is every where gladdened by fruit trees, and by fine specimens of the poplar or plane; another striking feature, also presents itself, in the luxuriant parterres of iris which crown the resting places of the dead. These cemeteries (often many acres in extent), appear so many vast fields of incense-like bloom,—which from all I could gather by enquiry, is chosen as the fit, or fleeting emblem of fickle human existence! I found but little to interest, or discover, in this straggling collection of hovels. The manufactures appeared to consist of parti-colored felt carpets, and coarse stuffs. I distributed seeds among the principal men, and gave them a few directions on their management. Thence there is a straight road to the capital, but I preferred making a *detour* that I might perambulate the entire valley;

and view it at my leisure. I took an easterly course, having the mountains of Pir Punjal on my right. The greater portion of my path lay over rich meadow land, occasionally interspersed with marshes, which were being operated on for the rice culture, viz.:—a number of buffaloes, rudely tied together, were being driven to and fro in the mire, into which they often plunged to the depth of their haunches. Other fields in a more forward state were being planted out, and flooded from the neighbouring *jheels* and brooks. I found villages cleaner, more populous, and more industrious than I had yet met with in my journey; but still there were many fine houses, whose inmates had been expelled for some convenient fault, and which gave a gloomy cast to the features of these rural colonies. Mohunpoor was my *habitat* for 24 hours. I was much struck with the primitive or antiquated style of the buildings. In Kashmere every thing is made of wood, if possible, and not the least conspicuous are the rude mosques and the carved railings of this material round the tombs of reputed saints. Every hamlet, however poor, has one or both of these indispensables, the place of worship also serving as a house of refuge for non-Mahommedan travellers. I was continually driven by stress of weather to avail myself of this strange shelter. The presiding priest, of course desiring me to do so. The food of the labouring classes is of the most wretched description, consisting mostly of greens or fruits, occasionally varied with a little maize, flour, and goat's milk. In the plots of ground near their huts, I saw growing pumpkins, cabbage sprouts, and turnips, but these luxuries only last for a brief summer. During the latter part of May heavy rains fall without intermission, which destroy these slender resources, and place thousands in jeopardy of sheer starvation. The Kashmerees are almost omnivorous. I saw fungi of all sizes and hues daily collected, and devoured by old women which in Europe would have entailed death to the eater;

either the soil of this favoured valley, or the stomachs of these hungry beldames must be of an uncommon order. On the green slopes, which are constantly grazed by sheep and horned cattle, I gathered quantities of superior mushrooms, and observed numerous champillons (a French dainty,) in the thickets on the hills, morels, or truffles are produced, which are dried, and sold in the chief markets. I have sent you a sample of one species of morel (?) which fetches two annas (of our money) per seer at Sreenuggur, called "*kungutch*," it imparts a rich mushroom-like flavour to soups, gravies, &c., and I used it in nearly every dish during my sojourn. I marched to the eastern extremity of the valley; I then ascended a low range of hills covered with profuse brushwood, and a variety of shrubs,--hawthorn, azaleas, clematis, wild vines, quince, crab, pear, &c. I descended this tangled wilderness into a lovely glen, called Mullaon, by far the most pastoral spot on eastern earth I had yet trod; snug homestalls, embosomed in groves of walnut, and mulberry trees, herds and flocks on the slanting meadows, orchards in full blossom, and parties of husbandmen at their varied labours—all contributed to clothe the scene with a truly British aspect, seldom beheld in despotic Asia! The numerous se pentine brooks which served to irrigate the cultivation were neatly planted with willow trees (some of which had attained a size seldom exceeded in Europe,) and over these pleasant streams a rustic-bridge was here and there thrown. Along the banks our more common English flowers recalled "Auld lang syne"—the forget-me-not,—dandelion, butter-cup, and meadow geranium, all in their natural simplicity. The feathered tribes were mostly in thorough unison with the vegetable life, jackdaws equally noisy, and numerous, with their northern fraternity, starlings in predacious flights, which cast their heavy shadow on the fields; the sky, wood, and titlarks, blithe and musical in the air, the missle thrushes melodious amid the plane trees, and a whole host of minor feathered favourites, sweet to the memory! Between this spot and Islamabad, which is the total breadth of Kashmere's renowned valley, is one long day's march, but stress of weather drove me into port, and so heavy were the torrents of rain that I had to pass two whole days in village hospitality. The pundits are the Hindoo aristocracy of the land, and until the Mahommedan invasion, (nearly 400 years ago) were the sole possessors and inheritors of the soil. Now they are solely, under peculiar sufferance, in their position as Brahmins, beneath the rule of a Dogra sovereign; rights and ownership they have none, but from open extortion, excessive taxation, and compulsory service they are altogether exempt, and in their religious exercises receive great assistance or countenance from the reigning Hindoo power, thus being in the local enjoyment of worldly benefits altogether prohibited to the followers of the Prophet.

A worthy man of the above class was my host for twenty-four hours; he fared better than his Moslem neighbours, and entertained me with cow's milk, butter, fine flour, &c. I gave him a variety of vegetable seeds, which he very eagerly accepted, and no sooner was my donation noised abroad, than I was surrounded by a crowd of anxious faces, all in search of a similar present. I bestowed on them the surplus of my stock, but could not muster enough to supply the whole community; as it was I was subjected during the remainder of the day to the most pressing solicitations to make another distribution in favour of the non-recipients, which caused me to regret not having brought a larger store with me. I was also subsequently asked to write *purwannahs,* liberating the growers of these English vegetables from any *future consequences* or *additional taxes.* What a monstrous system of monopoly it must be which thus criminally interdicts the fruits of the earth, and their cultivator!

At a Mussulman village, on my road, I found a silk establishment, the worms were just being hatched (May 20th) by wrapping the eggs in a woollen cloth, and putting it in the bosom of a man: the young brood are put with a feather on the new shoots of mulberry, and these are gradually changed to leaves, with the growth of the worm, which may be said to attain cocoon-*ship*, or maturity, in two months. The species struck me as being unusually large, and the silk of extra fine quality. Certainly no country in the universe has greater natural resources of silk growing, fineness of climate, cheapness of labour, abundance of food, and excellent markets at hand (on the Indus in our territories), but none of these under the present regime of unscrupulous exaction, appear to be of any value to the growers, who are thereby much reduced in number; indeed the "Lion" himself seems to have "put a strong paw" on the whole concern, together with every thing else of any value.

After crossing many foaming torrents of snow water by the giddy footing of a single log, and passing alternately through picturesque villages, (very *dirty* too) and marshy wastes, the footpath enters the fords through three distinct branches connected with the source of the Jhelum: the chief of these, the Arraputty, laves the environs of Islamabad, and is crossed either by wading knee-deep through the icy current, or by the more circuitous but dry passage of a very patriarchal line of planks on posts, which vibrate almost to the expulsion of the passenger.

Arrived at the semi-populated, ancient, dingy, many storied, extensive *distantly*-fine, second town in the valley, I took up my dilapidated quarters in the courtyard of the "Holy fish Tanks," overlooking which are many lofty wooden edifices, once used as summer resorts by the illustrious Akbar and his host of successors, but now mostly tenanted by travellers, tax-gatherers, faquirs, cats, rats, and bats, a community no less motley than common in my Kashmerian experience. The "holy fish" are in myriads, and consist of two sorts of trout, one white, the other yellow, and both spotted with black, it is esteemed a meritorious act to feed them: Gulab Singh often, by proxy, devotes to their ravenous maws enough flour to satisfy a dozen of his starving subjects.

The environs of Islamabad, and the open spaces in its interior, are beautifully clothed with umbrageous trees, foremost among which rise the truly eastern planes and poplars; from the boughs of the latter often gracefully depend the cable-like festoons of some ancient vine, left to its own natural habits; the ever present willow too in its aquatic pride fringes the river, and its tiny tributaries, with shady avenues. Dense orchards of the pear, quince, apple, apricot, plum, mulberry, cherry, &c., are occasionally met with near the outskirts, but they appear in a sadly neglected and uncared for condition, to judge by the degenerate quality of the fruits, and overgrown luxuriance of the branches. Grafting is generally known and practised, but it is rudely and unskilfully performed, and thence only a small portion of the scions strike; it is the primitive mode of operation called "cleft-grafting", and consists in selecting an old stump in spring for a stock, cutting it down to a short distance from the ground, and then roughly ripping it up at the head into 2 or 3 three deep incisions, within each of which a wedge-shaped scion is inserted, and the whole being cased over with clay and cow-dung, and afterwards surrounded by a wrapper of birch bark, is left to the charge of the elements. In a few instances I observed, that the bark binding was overlapped, so as to form a bucket for holding water, in which the scion no doubt had a much better chance of success. Gardening appeared at a very low ebb in this place, notwithstanding the large number of inhabitants, who would naturally be supposed to consume a great quantity of esculents. I found very few plots of ground devoted to their culture, and the kinds very limited in numbers.' These were squash, two varieties, tomatos, brinjals, onions, French beans, cucumbers, melons, capsicums, greens, &c.; and as might be expected, amongst such poverty, a paucity of floral charms to admire: they might be summed up in half a dozen species. *Pardanthus* (very fine,) China Aster, (three colours, *Erysimum Peroffskianum* fine), *Narcissus*, two kinds, &c.; and these were mostly in a newly-made pleasure ground, belonging to Gulab's Wuzeer, who in a true spirit of eastern vanity, hoped to rescue his name and rank from oblivion, by conferring on the overtasked population of his master, a summer-house and its gay parterres. Fountains, (fed from the same spring which fills the fish tanks,) were just completed, and an airy alcove was rising into shape, under the auspicious influence of this grandee, who came to visit his creation, during my stay, on an awe-inspiring tour to the districts, as a revenue collector. I superintended the sowing of more than half of these grounds with seeds of useful and ornamental plants (some 2 or 300 kinds), and stayed a few days to watch their success. I need hardly add that nearly every thing came up, and throve famously, but an unlucky flood came down from the river, and swelling the rivulet into an unruly torrent, it soon converted the scene of my labours into a swamp, where every green thing soon rotted. This is a very common every day occurrence in the "happy valley," and bunds are generally erected to prevent these calamities, but in the present instance, the proprietor, or his agents, had been asleep, and hence the result. I here distributed a quantity of potatoes, a vegetable which had not yet been introduced to this district, and have no doubt they succeeded well in the higher ground.

Tobacco, being an article of general consumption, is much cultivated by the husbandman; there appeared to be only two kinds, one very mild, its leaves of a pale, orange-tinted brown when dry, the other strong and full flavoured, a larger leaf, and of a much darker hue, both ridiculously cheap. The Kashmerians are inveterate smokers, and a hookah is seldom out of their hands: like all other natives of hilly countries, they use the genuine weed without any admixture of drugs or perfume, (as in Hindostan). Turnery ware to a small extent is made, and sold in the bazaars of Islamabad; the wood of the apricot being close-grained, neat, and strong, is the one most generally used. The articles consist of domestic utensils, as wooden bowls, cups, &c., and smoking apparatus, among which I saw several hookah stems of good workmanship. The carpenters and shawl weavers appeared to be the only active denizens of this decayed city, the former excel in the carving and designing of wood: lattices are generally used to admit light and air, and the patterns of these are as varied as they are tasteful. During one of my rambles in the outskirts, I noticed a very pretty tomb in a cemetery, and approaching it was surprised to find that the fabric composing the canopy was of wood; it was of very graceful execution; four light screens surmounted with a dome consisting of elegant fretted work in light deal. I was informed that it cost only twelve Kashmeree rupees, and was raised by a Sepoy in memory of his wife.

Were I doomed to choose betwixt the lot of a shawl weaver, or a caged bird, I would eagerly seize that of the latter, for (putting actual liberty out of the question) the little songster may be envied in the abundance of his food, and the quality of his work, but here in this, the land of abundance, we have an unmixed species of mankind, whose sole life is devoted to the production of luxurious garments, at the cost of time, health, sleep, and freedom, and small is the pittance which he is permitted to devote towards the necessities of nature; to recruit a frame prematurely debilitated by crouching in a dismal den, situated in some foul alley, where the pure light of heaven and the clear air are almost unknown! The shawl wool cannot be grown below a certain elevation. The acute Gulab, ever alive to his commercial interests, endeavoured long ago to produce this article nearer home, but nature was not to be bribed, and the golden fleeces refused to grow at any cost, hence the dearness of a genuine shawl, and hence the reason why the astute speculator adds 40 per cent. *ad valorem* duty on the purchaser: indeed the article is kept on hand until asked for, and when the price and other preliminaries have been duly settled, the unworked portion (usually the *centre*) is stamped, and the royal sanction granted to its being filled up, and made over to the buyer. Any evasion of this, or any other of the laws affecting the customs, subject an offender to the utmost rigour of despotic law, down to the third and fourth generation, though these unoffending kin subjects might be leagues away at the time of the offence being committed. Weavers, being low caste Mohammedans, are treated with the usual orthodox severity, and perhaps something more. Lean and emaciated as they always are, it does not exempt them from serving *gratis* as porters and beasts of burden, when the exigencies of the State demand a forced *dour* to the treeless and herbless wastes of Ghilghit. As no commissariat attends to their wants, and as they are supposed to carry all their requisites with them (in addition to the maund or two of army supplies) these miserable creatures drop from exhaustion, or perish. I am afraid to state the immense number who thus met their end on the last great expedition. The main facts are too well known *out* of the country for any suspicion of exaggeration to rest on my statement, which I often heard repeated, and in a variety of places by the host of witnesses, the widows and orphans of those who suffered! There is a great annual fair held near Islamabad, which draws a large concourse of strangers from all the Hindoo countries. I met Brahmins from Madras, Gosains from Muttra, Pundits from Delhi, and indeed specimens of all the idol worshippers from India. The *mela* lasts three days, and there appears to be no mercantile traffic on the occasion, but this is probably the result of the heavy duties imposed on every thing of public utility, or consumption. A fine salubrious range of low green hills rises abruptly from the town, and a pretty good road leads to their summits, on gaining which a fresh breeze contrasts itself rather agreeably with the relaxing climate down below. The jungle is low and bushy, and thinly distributed over the smooth sward: it consists principally of the dwarf *Catechu (khuera)* and the renowned Kashmere roses; these are properly speaking "briars," and are nearly identical with the "Austrian briar" of Europe; white, purple, orange, and sulphur yellow, are their usual colours. The flowers themselves have a strong disagreeable odour, but the leaves are deliciously perfumed with an aromatic scent of camphor and musk combined. These are all occasionally double "blossomed" in their wild state, but it is in gardens that we find them in perfection, their size and colour then becoming much more remarkable. I also found the sweet-briar growing in great profusion; quite a different species (or rather perhaps, *variety*) from the European: growth lower, and more spreading, leaves musk-scented and more juicy, flower a deep red. On the table lands further on mushrooms and champillons were scattered in endless profusion, attributable perhaps to the constant grazing of herds and flocks, which takes place in the summer. Two handsome species of *Salvia* ornamented the plains, and were very common, leaves large, and coarse in texture, the shape of the "officinal sage," on being bruised omit a very strong, medicinal perfume, pleasant, and aromatic. The flowers grow on spikes, the stems, about 2 feet high, and in the largest kind were pink or white, in the smaller one blueish lilac; indeed the latter sort is very showy and ornamental, and is now adorning my garden at Meerut; the local name is "Jān-i-adm," or the "*life of man,*" so called from a poultice or decoction of the fresh leaves being used as a curative emollient in inflamed wounds arising from sword or gun-shot; the bruised seeds are also prescribed internally by the *Hakeems* for certain disorders, and are sold in all the bazaars of the capital. The largest area of dry level plain throughout the entire valley is met with near Mattan, (whose wonderful temples and caves are said to be more than 2,000 years old, and which I duly explored). I should say that a larger cantonment than any in our possession might be built on it, but water is somewhat scarce, the jheels and pits filled by the rain being the watering places of cattle and flocks. This natural carpet of verdure is during the warm months much adorned by the wild thyme, which, with its delicate pink blossoms, everywhere meets the eye. I noticed two or three species. A few shepherds' huts, or an occasional miserable hamlet, constitute the only human habitations on the verge of this wide track, where the rugged rocks soon ascend into the awful majesty of stupendous mountains, stretching further into the untrodden precipices of Thibet. The vestiges of anciently extensive agricultural systems are to be found throughout the whole length and breadth of the valley; if it had not been so, Kashmere in its most palmy days could not have supported the vast population of which history uniformly speaks, so late as the reign of the Emperor Akbar, in whose well-known institutes, the country, and its revenues are ably described. Notwithstanding the invasions and consequent oppressions it had long previously suffered, the valley was still in a very populous and thriving condition, which, the good influences of that liberal and sagacious monarch bid fair to equal most provinces in Asia; and the present decline of its fortunes may be traced to the rapacity and misrule of most of his successors down to the present hour. Everywhere the traveller meets with the remains of reservoirs, aqueducts, dykes, canals, or other useful works of national importance, which anarchy has consigned to destruction. Scarcely a square foot of land appears to have been wasted or deprived of tillage. The fields extended even half-way up these rude mountains, which form the natural circumvallation of this remote "vale of vales;" the ridges, water courses, and land-marks being often perfectly distinguishable to an observant eye. At the most eastern point, near the source of the Jhelum, is situated Shahabad, a large village in much the usual state of decay, and in its vicinity a beautiful spot, (in consequence of natural springs much resorted to by Hindoos,) called "Vernagh." Here ruined gardens, and palaces again mark the shrine of defunct civilization. There is also another charmingly situated "*Zyanut!*" (or pilgrimage) at "Achahul," where magnificent plane trees, crystal water, and wild flowers all combine to arrest the stranger's admiration, and cause him to linger in meditation on the adverse spirit of time, which has wrought all this utter desolation.

The "Arraputty" is, I believe, the correct traditionary name of that branch of the Jhelum on which Islamabad stands. At all seasons it is easily fordable, though very rapid and cold, and generally so shallow, that the lightest skiffs, cannot come at any time within five hundred yards of the suburbs: boats of larger burthen, especially those which traffic in rice, carry passengers, and are inhabited by families, lie off the great bridge, at "Konibul," two miles off, where the river having been joined by its branches, suddenly deepens to several feet: the cargoes and merchandize are carried to and fro on the backs of the men and women in the osier baskets, known as "*Kiltas*," or if too bulky for this primitive method of transportation, are packed in saddle-bags, slung on mules, or donkeys, usually the latter: this latter method of carriage, (which was of course introduced by the Mohammedans,) has given birth to one of the favourite measures of local use, *i. e.* "*Khurwar,*" an "ass-load." All dry goods, especially grain, fruits, wood, snow, building materials and vegetables, are generally sold and purchased in this way, and sometimes land is computed at producing so many of these loads, in this or that description of crop. From the town to the ghaut there is an incessant crowd of passengers, and beasts of burden, going to or from Sreenuggur, the capital, or the many minor places on the banks *en route*, and more than two-thirds of them travel by the aquatic mode of conveyance in preference to the long and arduous walk by land. Labour being at a minimum price, and a boat belonging to nearly every Kashmerian, (however wretched), it is not strange that a constitutionally indolent race should prefer lounging in a floating house to tiring their limbs on shore, independently of not having to carry their wants on their backs. The bridges are wonderful erections of their kind; their visible substance certainly does not inspire confidence in the beholder, but yet theory has given way to practice, and many of them, after *five hundred years*, uphold the gothic style of engineering. Two main points there are which have vastly favoured them: 1st, there is not a white ant, or any subaqueous insect to devour their material, the melted snow, and icy season together keeping off this description of vermin. 2nd, cold itself is a most effectual preservative, and constant immersion in a temperature, never even *warm*, must vastly contribute to prevent fungi, or structural decomposition. Occasionally the winds and waves may dislodge a plank, or capsize a supporting beam, but their very simplicity conduces to the rapidity and solidity of their renovation. The principle that yields moderately to the united force of the all-powerful elements, winds and water, evidently surpasses that which endeavours to combat them by artifice. Many a massive rampart and lordly buttress has been levelled to the earth by tides, flood, and air, to which these Kashmerian structures have remained scathless for centuries; for be it known that one night from a sudden thaw, the frigid Jhelum often rises *twenty feet*, driving the inhabitants of the lower districts to their rude craft on its bosom, and often does the hurricane without sign or warning, sweep down with mad violence (especially around the Wuhir lake) without shaking these (apparently) *shaky* communications from their antique foundations. They appear to be built in the following primitive manner. The number of arches according to the breadth of the stream, having been decided upon in its lowest state, (which is often such as to present nearly half of the dry bed) substantial piles are sunk, or buried at those points, and well covered with layers of stones, and shingle; a projecting breakwater at an acute angle, being often constructed to turn the velocity of the current: (this appears very effective in its application) upon this basis rests the stock, or pile of wood, forming the square compartment, (which from its shape can hardly be called arch, though it answers that purpose effectually): these huge logs are all heaped in tiers cross ways, and are usually carried up to 30 feet, or more, so as to be far above the highest water mark: fine sound pine timbers are then laid longitudinally, so as to have their ends meeting on the centre of these heaps; smaller pieces cross them again, and to these are nailed with wooden pegs all the planks which constitute the flooring, (generally fir for lightness.) Through this apparently crazy invention the wind whistles, and the water hisses in wild harmony, but, as I said before, this very plan of ingress and egress to their united forces is the safety of the whole. As might be supposed, there is a great vortex always to be found below the bridge, but except in rough weather it seldom interferes with the boatman's calling. A new feature in navigation presents itself to the stranger when he embarks on the Jhelum: I allude to the unfeminine employment of the rowers, of whom more than *one half* are of the *gentler* sort. Age, sex, and religion seemingly do not interfere with this uncouth and certainly *un-oriental* employment; any woman who cannot pay to be rowed, must row for herself and her family, and may perhaps under Fortune's smiles, earn an occasional meal thereby. Assumed poverty seemed to me a characteristic of the holy Hindoos, and it was not uncommon to see even their women engaged in the drudgery of the oar, but it was alway exercised on their own behalf, or that of their earthly lords, and never for pecuniary gain, like the less lucky Mahommedans.

The vessels are curious contrivances, the farthest from architectural improvement I ever beheld: the larger craft are not bad models of "Noah's Ark," equally solid, and equally capacious, built entirely of fir timber, the breadth of beam enormous, and the length so unmanageable, that it often takes a *whole day* to turn round in a canal after discharging the freight. Those employed as "lodging houses" are even more unweildy, and often contain a strange medley of society: these are thatched nearly to the water's edge, and any holes which time and the poultry may have perpetrated in the roof are patched from time to time with parti-coloured rags, or with any remarkable rubbish which may be at hand: four or five families (including always many squalling brats,) tenant these crowded berths, their goats, fowls, ducks, and dogs always accompanying them, and assisting in the general uproar, and impurity: every cabin has its fire-place, and every fire-place its attendant volumes of nauseous smoke, the produce of wet sticks, or still more unfit materials. From sunrise till sunset this crowded community furnish a fearful picture of debased humanity, too idle, or too helpless to work, or what is more probable, quite shut out from the *opportunity* of working (except occasionally gratis on the tyrant's account), subsisting on wild fruits, and weeds, with goat's milk, (their poultry, and its eggs being kept for the white visitors, whose money paid for the same, will perhaps benefit some watchful soldier) their persons barely clad with rags, and unapproachable as bad living, dirt and vermin can render them. Their angry jabbering in constant warfare with each other, altogether form a hideous Babel of human misery, in the centre of nature's most lavish gifts, and which reveals the gross system of misrule, under which the people are struggling.

(To be Continued.)

Notice regarding the oil obtained from the kernel of Juglans Camirium, (Aleurites triloba, Roxb.) "Dhesee akroot." By DR. R. RIDDELL, *Superintending-Surgeon, Nizam's Service, Corresponding Member of the Agricultural and Horticultural Society of India.*

BOLARUM, *4th May*, 1853.

I do not know whether in the lower parts of Bengal the *Juglans Camirium* bears fruits. I have in my garden a tree near 40 feet high, that has borne for many years, but the fruits the natives do not think wholesome, for I observe they never steal them. From the kernel I have obtained a very pure fine oil, but for want of a mill I was obliged to use heat. Four pounds of the nut has yielded exactly 50 per cent. of oil, and the tree near or full 8,000 nuts. Surely such a tree ought to be more extensively cultivated; and as it grows quick from fresh seed at the commencement of the rains, I will send you any quantity if you require them, also a specimen of the oil. One hundred of the kernels from as many nuts, gave exactly five ounces of fine yellow sweet oil. The nut in taste resembles the common walnut, but as they are considered unwholesome until kept a year, few like to eat them, even then. A friend gave me sometime ago a small bottle of walnut oil he brought with him from the Upper Provinces; it has a fine scent like the fresh walnut, and I believe it to have been made from the nut generally eaten, as I remember often hearing when up in Hindostan, that the natives made oil from the nuts common in the Himalaya: and I attribute the oil retaining its peculiar odour to its being, in all probability, pressed and not extracted by boiling. As my supply of nuts should yield nearly twenty pounds of oil, I am almost inclined to make a small mill for the purpose, as I should not like to trust, even after most careful cleaning, to a bazar one.

BOLARUM, *4th Oct.*, 1853.

I have been a long time replying to your kind communication of August 23rd; nevertheless some days ago I forwarded to you a small parcel by banghy of the *Aleurites triloba* nuts, and shall take an early opportunity of sending some of the oil. You will see, by the accompanying copies of letters, that the oil has been tried at Madras, and is considered to be of a superior quality to linseed: and I fancy if it could be properly pressed, would stand next in estimation to almond and olive. The nut when fresh is said to be of a purgative nature, but if kept for a year it loses that quality. I know however some persons eat them with impunity. After the proceedings of the Agri.-Hortil. Society of India for August had been published, I received a letter from a gentleman at Allahabad, requesting me to send him some of the nuts, as he wishes to introduce the tree in the districts where the *Mowa* thrives. I sent him off a quantity at once, but was unable to furnish him with the native name of the tree, which he asked for; neither Roxburgh or Ainslie have any other name but *Akrote*, or *Akiroot*, which is the *Juglans regia* of Lin:

Extract of a letter from DR. ALEX. HUNTER, *to* DR. RIDDELL, *dated Madras, 20th September*, 1853.

"Many thanks for your kind letter of the 31st May, accompanied with excellent walnut oil and seeds of the tree, which you name *Juglans Camirium* I think. We cannot find any account of this species;* but there is no doubt the oil is of very fine quality, and likely to become an important article of commerce. It will not do as a substitute for olive or almond oil except for a few purposes, as it is a drying oil, though it does not dry so quickly as linseed oil. It is much better than the last however, and would probably be put to a great many uses in England, if it could be landed there at a moderate price. We may perhaps require it in our school as a painting oil, for which it seems well suited, as it does not get stiff and cloggy like the linseed oil, nor does it turn brown I believe in drying. I send you an extract from our last proceedings, which will show you how much your discovery is appreciated."

Extract from the Proceedings of the Indian Drug Committee, at a Meeting held on the 13th September, 1853.

Read letter from Dr. R. Riddell, Superintending-Surgeon, Hyderabad Subsidiary Force, dated Bolarum, 31st May, 1853, accompanied with two pints of walnut oil of good quality, expressed from the seeds of the *Juglans Camirium*, a large elegant tree, that grows abundantly about Bolarum. One tree is said to have produced this year 8,000 walnuts, (a few of these accompanied the oil). They are said to grow readily if planted in moist ground, and the tree does not require any particular care more than watering for the first two or three years, when it will commence to bear fruit. The tree blossoms about the end of the hot season, and the seeds yield about half their weight of oil. On examination the oil appears to resemble linseed oil in smell, and in other properties, but it is paler and more limpid. It is of more commercial value than linseed oil, as it is less liable to rancidity, does not become so dark in drying, and is much esteemed by artists. The sample forwarded had been tried in oil painting, and was found to be well suited for the purpose. The Professor of Botany intimated that several of the seeds which had been sent to the Horticultural Society's Gardens, were now growing. The Committee are of opinion that this is a most important discovery, as the tree is very easily reared, and yields a large quantity of fruit. The oil they consider to be a good substitute for linseed oil, and one that may hereafter prove of commercial importance.

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* A full account of this tree is published, under the name *Aleurites triloba*, in Roxburgh's *Flora Indica*, Vol. III, p. 629, where it is stated that the kernels taste very much like fresh walnut, and "are reckoned wholesome; they yield by expression a large portion of very pure, palatable oil." A specimen is in the Society's collection of oils: it was presented in 1844 by Dr. Wallich, with the remark that it was considered by the late Dr. Fleming, a near approach to olive oil. A specimen of the oil was also submitted at the Great Exhibition, and a reference to it will be found in the official descriptive and illustrated catalogue of the Exhibition, part 4, p. 880.—EDS.

Resolved that Dr. Riddell be thanked for his very interesting and important communication, and that he be requested to inform the Committee in what quantity, and at what price the oil can be procured.

True Extract,
(Signed,) ALEX. HUNTER, M. D.,
Secy. I. D. Committee.

On the juice of Euphorbia ligularia, as a substitute for Gutta Percha. By A. H. CHEEK, ESQ., *Civil Surgeon of Cawnpore.*

(Communicated through Dr. Falconer.)

I forward to you herewith a letter which I have received from Mr. Alfred H. Cheek, Civil Surgeon of Cawnpore, together with an enclosure addressed to yourself, and the specimen of the material referred to by Mr. Cheek.

Mr. Cheek in his letter states that the substance is procured from the "*Prickly Pear,*" being, as you are aware, the name commonly applied in this country to the *Cactus Dillenii.* But none of this family yield milky juice, and the "*Tooer*" referred to by Mr. Cheek is probably a species of *Euphorbia*,* of which genus all the large species yield milky juice abundantly.

I have examined the substance prepared by Mr. Cheek. At the ordinary temperature of the atmosphere at this season, it is soft, plastic, white in the centre, and somewhat sticky, like "bird's-lime," with hardly any elasticity, but when put into water cooled down to 40° Far. with ice, it becomes hard, tough, and tenacious.

In the natural state, as forwarded by Mr. Cheek, it is certainly unfit to serve as a substitute for Gutta Percha, in any of the ordinary applications to which that useful substance is put, but it is possible that its physical properties might be beneficially altered by the aid of chemistry, and I consider that the subject is well worthy of further investigation.

In any case Mr. Cheek is entitled to the thanks and acknowledgments of the Society for his interesting communication.

GARDEN REACH, 8*th April*; 1853.

Having sometime since read that a substance resembling Gutta-Percha had been extracted from the "*Mŭddār*" by some medical officer in the Madras Presidency, I have also carried on this experiment too, and find it certainly resembles the Gutta Percha in most, if not all its properties, excepting its taking a longer period to harden when exposed to cold air and cold water. I have however carried this interesting research further, and I have now the pleasure to lay before the Society a specimen of a substance extracted from the milk of the "*Tooer,*" or "*Prickly pear,*" which, after evaporation and exposure, also resembles the Gutta Percha in its appearance and consistency, but possessing ,far greater properties of elasticity and tenacity; it also moulds easily into any shape, and becomes hardened in cold water, though this also takes a longer time to become *hard* than the Gutta Percha does. I send a specimen for the members of the Society to test and examine, and I feel convinced if this substance were properly prepared and attended to, which I have not the means or opportunity of doing, it might be brought to many if not all the uses of the Gutta Percha. The milk from this "*Prickly pear*" is procurable in any quantity all over India, as each branch of each tree yields a regularly large portion of this milky gum. In addition to this, after the milk has been taken from the tree one day, the bark closes up, and a like portion can again be extracted from the same branch. This tree can also be propagated to any extent, by merely breaking off a branch and planting it in the ground in the *hot* weather, (sowing or planting it in the *rains* is useless, as the stem rots, which is not the case if planted in the *hot* season!) If this singular product could be brought into commercial use, there is no quantity that could not be supplied in this country. The milk flows freely from merely a slight incision into the bark. The specimen I now send has merely to be dipped in a little warm water, and then into cold water, and after a little manipulation its excessive tenacity and elasticity will be manifest, requiring main force to separate it, and pull it asunder. If the Society think it of sufficient interest to write to me for any further particulars regarding this new substance, I shall be happy to state all I know regarding its preparation. The reason why I have sent it to the Society for examination is, that I am confident, if it was taken up by some *practical* person, this substance could be brought into general use, as nothing could more closely resemble that useful commodity Gutta Percha than this substance does.

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* Mr. Cheek has since sent down specimens of the plant in question, which Dr. Falconer recognizes as *Euphorbia ligularia*, the "munsa-shij" of Bengal.—EDS.

(Signed) Alfred H. Cheek,
Civil Surgeon, Cawnpore.

Cawnpore:
28*th February*, 1853.

To A. H. Blechynden, Esq.,
Secretary Agri. and Horticultural Society.

Additional notices respecting the useful properties of the Mŭddār plant, (Calotropis Hamiltonii.) By Capt. G. E. Hollings, *Deputy-Commr., Shahpore, Punjab.*

25*th May*, 1853.

I have been trying experiments with the Mŭddār Gutta Percha based on the information given by Dr. Riddell. The tests he mentions were tried at my request by Baboo Ramsoondur Ghose, Sub-Assistant Surgeon at Leia, and Baboo Neelmadhub Mookerjee, Sub-Assistant Surgeon at Shahpore; they were attended with precisely similar results. In addition I have endeavoured to turn the composition into use, as the means of obtaining clear impressions of old coins. The specimens enclosed will show to what degree I have succeeded. They afford great encouragement for the future, and I have little doubt of being able to take most exact impressions of all the coins in my possession; if the process succeeds numismatologists will be saved much trouble and anxiety. They will be able to take copies of all coins and gems they may be so fortunate as to obtain possession of, and they will be saved from the vexation and disappointment and delay that now takes place in publishing plates of coins, as well as considerable expence, and above all they will be able themselves to illustrate their writings with elegantly finished designs of their much-valued treasures.

I have promised my coins to the Delhi Archæological Society on certain conditions, to which they have consented, but if I succeed in taking good copies from the Mŭddār composition, I will reserve a complete copy for presentation to the Agri.-Horticultural Society, with which I have been so long associated.

9th July, 1853.

I have despatched to your address by this day's dak banghy, a specimen of Mŭddār Gutta Percha, and shall feel obliged by your ascertaining through the Committees of the Society, the Chamber of Commerce, or a reference to Dr. Montgomerie himself, if he should be at or near Calcutta, if it is such an equivalent for the Gutta Percha of commerce as is alluded to in the offer of premiums by the Society of Arts in London*. Should the heat have rendered the mass soft, kindly put it in *cold* water for two or three days before you exhibit the specimen; or if dipped in warm water, it becomes perfectly plastic.

I should like to know what price the article would fetch in the English market, and if there would be any demand for it in Calcutta.

3rd Sept., 1853.

I have to thank you for yours of the 23rd August. I was glad to find that the specimens of Mŭddār fibre had been admired but should be better pleased to hear that it is considered a good substitute for hemp. I am much obliged to the Society for sending the specimen of Mŭddār Gutta Percha to the Society of Arts in London; it would I think be a good plan to send at the same time specimens of the fibre and thread.†

With regard to the Gutta Percha it may be interesting to some of the members to know that I have used it, instead of silk, for isolating wires used for the conveyance of electricity, and have found it to answer very well. In one experiment I placed a wire covered with Mŭddăr Gutta Percha in a brass vessel filled with water, and found that the electric spark was carried along the inner wire without interruption. My experiments were necessarily imperfect, but as the Gutta Percha gets as hard as stone under water, and completely dissolves in spirits of turpentine, it might be used with advantage, either as a simple envelope, or mixed with varnish to isolate the wires of the electric telegraph. I have some 35 or 30 lbs. prepared, which I shall be glad to place at the disposal of the Society, if they feel inclined to recommend the institution of any experiments.

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* The specimen has been forwarded for report to the Society of Arts, London.—Eds.

† This request has been anticipated.—Eds.

25th September, 1853.

I write these few lines to mention that I have despatched to your address some specimens of the Mŭddăr Gutta Percha, in order that you may see how much it is improved by repeated manipulation, and how much more pliable and plastic it becomes.

According to every experiment that has hitherto been tried, the result has shown it to be identical with the Gutta Percha of commerce. If in every district in which the plant abounds the natives were encouraged to collect the milky juice, and allow it to coagulate by evaporation in large shallow earthenware pans, the product might find a remunerative market. The experiment would be very inexpensive. I am trying it on a small scale, and in due course of time will communicate the result to you.

There is no secret or difficulty in the method of preparing it, which is precisely the same as that described in the "Visitor" for 1848, page 265, in the following words "The crude Gutta Percha," says an intelligent writer, "is, in the first place, cut into thin slices in a very ingenious manner. Upon an iron disk, which is connected by gearing to the shaft of a steam-engine, are placed three radial knives, which are capable of being placed at any degree of projection. The lumps of Gutta Percha being pressed against this iron plate, is cut to any desired thickness, by its revolving in a very rapid manner. The slices are afterwards collected, and put into a vessel filled with hot water, in which they are left to soak till they are soft and pliable to the touch. The thoroughly softened pieces of Gutta Percha are then exposed to the action of the "breaking and mincing cylinders," which make from six to eight hundred revolutions in a minute. It is thus broken up into shreds and fragments, and considerable quantities of earthy and other extraneous matters are beaten out and disengaged from it, the whole falling in a mingled mass into a vessel of cold water beneath, when the different materials assort themselves according to their specific gravities; such pieces as are of pure Gutta Percha, or in which that substance predominates, float on the surface of the water, whilst most of the earthy and woody matters sink to the bottom. Being subjected to this process *several* times, the Gutta Percha is eventually freed from all extraneous substances, and is in a fit state for being moulded again into a mass. To effect this object, the soft and ductile material is submitted to the operation of the "masticating machine," by which it is kneaded into a perfectly uniform mass, after which it may be employed for any purposes of utility or ornament." In the absence of machinery I employ manual labour. The crude material is pounded in a mortar similar to that used for pounding "*soorkee*," it is frequently boiled, and when soft, torn into shreds, and thrown into cold-water, rolling, kneading, &c., as in ordinary cases.

The Society are aware that my attention was first directed to the preparation of a material equivalent to hemp or flax from the fibre of the Mŭddār. The report of the Society's Hemp and Flax Committee was very favorable to its introduction, the only objection that exists against its being extensively produced is the tedious and expensive manipulation which its manufacture involves. When public attention was aroused by the publication of Major Meadows Taylor's letter regarding the result of Dr. Riddell's experiments, which showed that Mŭddār yielded a juice, from which a substance exactly similar to Gutta could be produced, I determined to try the same experiments as Dr. Riddell had done, and meeting with the same results, I followed them up by adopting a process of manufacture resembling, as much as the means at my disposal and circumstances would admit, that by which Gutta Percha was prepared in England.

If it is ultimately proved that a perennial shrub, so abundant as the Mŭddār, produces a substance equivalent to Gutta Percha, all those who have been instrumental in developing the fact, will have good cause to be pleased with the result of their labors.

To A. H. Blechynden, Esq.,
Secretary Agri.-Horticultural Society of India.

Dear Sir,—In reply to your letter dated the 5th, and received on the 7th instant, I beg to say that I shall have great pleasure in subjecting the Mŭddār extract prepared by Captain Hollings to conclusive experiment, as to its applicability as a substitute for Gutta Percha for telegraphic purposes.

Mr. Brunton, the Deputy-Superintendent in charge at Madras, has been for several years assistant manager of the principal Gutta Percha works in London, and has superintended the manufacture and testing of many thousand miles of coated wire. Mr. Brunton can decide at once whether the proposed substitute is of any value. The property described by Captain Hollings of its hardening under water, is not encouraging. Retaining its softness and flexibility under water is one of the best properties the true Gutta Percha possesses.

It would be difficult to over-estimate the importance of this subject. A cheap and abundant and effectual substitute for Gutta Percha would immediately lead to the exclusive use of the subterranean system of constructing telegraph lines, instead of the over-ground method which we now adopt from motives of economy alone.

Your's faithfully,

CALCUTTA, E. T. OFFICE, W. B. O'SHAUGHNESSY,
8th November, 1853. *Supdt. Electric Telph.*

Notice regarding Mŭddār Gutta Percha. By DR. RIDDELL, *Superintending Surgeon, Nizam's Service; Corresponding Member of the Society.*

I have the pleasure to send you by this day's banghy in a tin box, not by any means large, some Mŭddār Gutta Percha preparation, which perhaps may be acceptable for your Museum. A Gutta Percha cup, one of the first I made, some impressions from coins, also from a sygnet ring found at Babylon by an old friend of mine, impressions from two Scarabai taken out of the tomb Belzoni last opened in Egypt. These impressions in themselves may be worthless, but they will show how exactly copies of coins or other articles of virtu may be taken. I have sent home nearly all the Gutta Percha remaining, but as you may like to test mine by other specimens which may be sent you from other parties, I have added a seal impression of my own. You can soften it at any time in hot water. I made it six or more months ago. I am unable to account for the black-looking Mŭddār. A friend at Hingolee, seeing the account of the discovery, collected the juice and dried it as directed; when put in hot water, it becomes of a greyish white similar to my own. You will find two impressions from a coin of mine, marked with a cross thus—+. The composition is from the milk hedge, the one known as

Euphorbia Tirucalli. I fancy Dr. Cheek, at Cawnpore, must have collected the juice of the *E. neriifolia*, the Hindostanee name is both Thor and Seej, and it is called the prickly pear by Graham and others; (I only know the prickly pear as a *Cactus*, and a very noble-looking plant it is, the fruit when ripe is of a beautiful pink, covered with prickles. In Spain the fruit is eaten, and so it is here by children, the juice has been used in Bombay to color ices), but what resemblance it has to a pear I cannot see. Now the *Opuntia Dillenii* does in its leaf and fruit. I remember seeing in one of Theodore Hook's novels that it grows some where in the islands surrounding Madeira, and that the inhabitants use the wood for buggy shafts; what kind of prickly pear can it be?

In a subsequent letter, dated 4th October, Dr. Riddell writes as follows:—

Since I last wrote you, I have heard from my friend a chemist in London, to whom I had sent specimens of the Mŭddār Gutta Percha to be examined and reported upon; he kindly put it into the hands of a scientific gentleman, Professor Redwood, who says "the substance resembling Gutta Percha, obtained from the Mŭddār, I find that it possesses several properties in common with Gutta Percha, while in other respects it differs. The description given in the printed account (*i. e.* the newspaper extract,) is correct." He has tried several means of vulcanizing it, but has not succeeded, and does not think it could be deprived of its property of being a conductor of electricity.

Notice regarding the green vegetable dye of the Chinese. *By* T. F. HENLEY, ESQ.

Permit me to offer the suggestion to the Society, that the necessary enquiries be set on foot with a view to introducing into this country, the manufacture of the *green vegetable dye* of the Chinese called green indigo, the value of which as a beautiful natural dye has lately been established by the enquiries of the French Chemists.

Monsieur Persoz who had an opportunity of examining this substance, states that in thin plates it is of a blue color resembling Javanese Indigo. It is soluble in water, producing a fluid of deep greenish blue. With the assistance of mordants, it produces various shades of green of great beauty and stability, differing therefore totally from Indigo both in composition and chemical properties. We may reasonably infer that the plant from which this valuable substance is obtained, if not already existent in this country, may be successfully introduced, and another important drug be added to our commerce.

With this object in view I have had the pleasure to submit this suggestion to the Society.

[The memoir by M. Persoz, referred to by Mr. Henley, entitled "On a green colouring material produced in China," has been published in the "Comptes Rendus de l' Académie des Sciences" of the 18th October, 1852. M. Persoz states that his attention was first attracted to the subject by having received the previous year a specimen of calico died in China, of a rich and very permanent green, with a request that he would endeavor to ascertain the composition of the green color. Every attempt to detect evidence of the presence of a blue or yellow, in the specimen, having failed, he was led to the conviction, by isolating the coloring principle, that the green was produced by a dyeing principle of a peculiar nature. His curiosity being excited, he obtained direct from Canton, in November, 1851, a specimen of the material for a more detailed investigation, the result of which is given in his memoir. M. Persoz infers from these experiments, that the Chinese possess a dye stuff presenting the physical aspect of Indigo, which dyes green with mordaunts of alum and iron: and that it contains neither indigo nor any thing derived from that dyeing principle.

The attention of Mr. R. Fortune, who is at present in China, has been drawn to the subject by the Society, with a request that he will endeavor to meet the suggestion of Mr. Henley.—Eds.]

Correspondence and Selections.

REPORT ON THE HORTICULTURAL GARDENS, OOTACAMUND, NEILGHERRY HILLS.

To the Secretary of the Horticultural Gardens.

SIR,—In this, the third report on these Gardens, I shall endeavour to shew in a brief and tabular form, (accompanied by a plan of the Garden, by which it will be better understood,) the number of fruit trees and shrubs, useful and ornamental trees, shrubs, flowers, &c., that have been introduced within these last three years, with the success and failures that have attended them.

I will then add a few brief remarks on the present state, resources, and future prospects of this Establishment, together with a few remarks on the agricultural produce.

The following is a table of the plants introduced :—

Names of Plants introduced.	Number of species or varieties.	Number of Plants originally received.	Number now propagated from the original stock.	Number of Plants permanently planted in the orchards.	Number of Plants on sale.	Number of varieties failed, from various causes.
Fruit trees.						
Apples, ...	67	75	1,600	1,000	600	8
Apricots, ...	7	9	500	350	150	0
Ardwenia Grandiflora, or Capeplum,	1	seeds	50	50	0	0
Almonds, ...	2	2	35	10	25	0
Cherries, ...	6	8	24	15	9	0
Filberts, ...	1	4	18	10	8	3
Figs, ...	4	5	1,200	1,150	10	0
Guava, ...	2	15	45	45	0	0
Granadella, ...	1	1	60	13	57	0
Grape-vine, ...	4	cuttings 30	100	50	50	0
Bread fruit, ...	1	12	12	12	0	0
Lemon, ...	3	3	18	18	0	0
Lime, ...	2	2	9	9	0	0
Loquat, ...	1	1	50	3	47	0
Mango, ...	1	cuttings 20	15	15	0	0
Mulberry, ...	3	3	29	29	0	0
Medlar, ...	1	1	3	3	0	0

	Names of Plants introduced.	Number of species or varieties.	Number of plants originally received.	Number now propagated from the original stock.	Number of Plants permanently planted in the orchards.	Number of Plants on sale.	Number of varieties failed, from various causes.
	Orange,	2	2	100	70	30	0
	Peaches,	3	20	3,000	1,500	1,500	17
	Pears,	42	50	700	500	200	18
	Nectarine,	1	1	10	5	5	0
	Plums,	39	39	800	500	300	0
	Pine Apple,	2	6	24	20	4	0
	Quince,	2	7	50	35	15	5
	Fruit Shrubs.						
	Currants,	6	cuttings 16	500	300	200	0
	Gooseberries,	5	15	80	15	70	9
	Raspberries,	3	seeds	8,000	4,000	4,000	0
	Strawberries,	10	seeds	16,000	9,000	7,000	0
	Blackberries,	1	seeds	200	200	0	0
	Useful and ornamental Trees, Shrubs, and Flowers.						
British.	Trees,*	10	seeds	32	32	0	0
	Shrubs,	46	seeds	125	80	35	20
	Flowers,	29	seeds	500	300	200	0
American.	Trees,	18	seeds	100	80	20	10
	Shrubs,	22	seeds	500	350	150	0
	Flowers,	80	cutts. & sds.	1,500	1,000	500	31
Cape.	Trees,	22	seeds	340	340	0	14
	Shrubs,	15	seeds	200	0	100	0
	Flowers,	56	roots & seeds	600	400	200	17
Australian.	Trees,	165	seeds	20,000	10,000	10,000	0
	Shrubs,	50	seeds	200	100	100	0
	Flowers,	10	seeds	80	60	20	5
Chinese.	Trees,	7	seeds	25	0	0	0
	Shrubs,	12	seeds	150	0	0	0
	Flowers,	25	seeds	700	600	100	0
Himalayan.	Trees,	9†	seeds	800	0	300	0
	Shrubs,	6	seeds	400	0	150	0
	Flowers,	0	0	0	0	0	0

* The greater part not growing well, especially the Pines.

† Nearly all Pines.

By the above table it will be seen that the greatest variety of timber and ornamental trees are from Australia. Australian plants of all kinds thrive particularly well here, which is a mark of the similitude of this climate and soil to that of Australia; many of the American trees introduced last spring died off during the monsoon from damp, those plants however that have got over the first season are in a very thriving condition. It is worthy of remark that Himalayan and Cape Pines, if sown after the monsoon, do well, while those sown before the monsoon get checked in their growth by the cold westerly winds from which they never recover, there are many plants of the stone pine on these hills 6 and 8 years old not more than 6 inches high, while those sown in these gardens last autumn are from 15 inches to 2 feet in height: had the American plants been sown at the same season it is probable they would have succeeded equally well.

Present state of the gardens, resources and future prospects.

The gardens have this season arrived at that period when we have got abundant material to work upon, as we never received more than two plants of any variety of fruit tree from England, and these generally so much weakened by the long voyage and heat they made little or no wood fit for budding or grafting the first season, so that this is the first year in which we have been able to propagate fruit trees on a comparatively large scale. This season many thousands of apples, pears, plums and peaches have been propagated, and next year we shall have sufficient material to propagate three or four times that number, and so on from year to year, the increase will be in like proportion. The cherry is the only fruit tree we are not able to propagate rapidly, as we have no stocks on which that plant will thrive, the only means of increasing it being by budding on the roots, by which means we cannot raise more than 20 or 30 plants annually.

The table shews a deficiency in some other fruit trees, for example figs, but though at present only 10 plants of these are available for sale, in a few months hence 300 or 400 young plants will be ready. In like manner with the others, of which there are but few, as well as many of those which at present we have not sufficiently propagated to fill up our own orchards.

If common success attend our endeavours, there is no doubt that in a year or two this establishment will become a self-supporting one. These last two years we have realized from the sale of the produce of the garden on an average about one-third the amount of expenditure, and during that time the greater part of my time has been devoted to the propagation of fruit trees for our own orchards, but now that these are nearly all planted (with the exception of a few spaces for the rare sorts,) the whole of the plants propagated will be for sale—I shall also have more leisure to give the attention necessary to the growth of seeds. The seeds formerly sent out by this establishment were of necessity of very inferior quality being all grown in one place. Those sent out this year are very much superior, as we have now 5 gardens where the plants for seeds are grown, and these in localities sufficiently apart to prevent impregnation, 3 of these gardens being only one year cultivated, the soil is still inert, and not productive enough to raise plants of that superior nature that are required to produce the best seeds, when these three gardens come into proper heart, which will be by next crop, the seeds from which will be gathered in about 18 months from this date, the Society will then be able to offer to the Indian community seeds at a very low price, and of as good quality as can be produced in any part of the world.

After this year, the experiments on grain will be discontinued, and the produce of the kinds that are found to thrive best, distributed among the Native cultivators for seed. At this elevation (7,300 feet) Spalding's prolific red wheat, and long white spring wheat have been produced of quality equal to the average produce of the best wheat counties in England, other varieties of wheat from some cause or other have not succeeded so well.

Barley, oats, and pasture grasses, thrive particularly well, also green crops: the hop, which hitherto has not done well, is this year shooting out very strong from plants propagated from cuttings. It would appear that the original plants had contracted some disease in their roots on the voyage out, and on that account made no progress, this was the case with a great many of the fruit trees, especially the peaches.

At Kulhutty, (elevation about 4,500 feet) we have had very good crops of American maize. The cotton plants there are also very healthy and growing well—this crop will be ready to gather in about three weeks. In concluding this report I beg to acknowledge the assistance I have received from E. B. Thomas, Esq., Collector of Coimbatore—to whom we are indebted for many valuable Cape and other trees. To Dr. Royle of the India House, to Major Minchin, to Colonel Watson, and to Arthur Hall, Esq., Assistant Collector of Canara, we are indebted for many plants and seeds, also to Dr. Jameson, Superintendent Botanic gardens at Saharunpore, for numerous tea and pine seeds.

OOTACAMUND, NEILGHERRY HILLS, W. G. McIVOR.
23rd June, 1852.

Dr. Wight's remarks on Mr. McIvor's report on the Horticultural Gardens.

Coimbatore, 8th July, 1852.

DEAR SIR,—I had the pleasure a few days ago to receive your letter of the 28th ultimo, transmitting Mr. McIvor's plan and "report on the Horticultural gardens of Ootacamund," and requesting me to oblige the Committee with my opinion, in some detail, "of the present condition, resources, and prospects" of that establishment, "with reference to the contemplations of the Honorable Court in supporting it."

I have read the report with much pleasure, and viewing it in connection with what I saw in the course of my frequent visits to the garden during the preceding three months, cannot but think that the unassuming writer has done himself less than justice.

The tabular statement of plants introduced, and in course of propagation, I look upon as especially valuable, as being of itself conclusive of the benefit the gardens are in course of conferring on the Horticulture of this portion of India, by furnishing an abundant supply, to all stations in which they may be found to succeed, of nearly all the finest varieties of European fruits. And not less worthy of consideration is the prospect they hold out of supplying India with really good vegetable and flower seeds. On this head I confess I am not so sanguine as on the other, but should Mr. McIvor's anticipation "that within 18 months he will be able to offer the Indian community seed, and at a low price, of as good quality as can be produced in any part of the world," be realized, he will indeed prove himself the greatest benefactor to Indian horticulture that has yet appeared amongst us, and give all who take an interest in gardening most substantial grounds for thanking the Marquess of Tweeddale for originating the garden, and still more the Honorable Court of Directors for so liberally supporting it, and providing a man so eminently fitted to manage its affairs during the early and most trying stages of its existence.

But on this point, as just remarked, I feel less sanguine of success than he does, which in other words, is simply to express a doubt of the possibility of his accomplishing the object in view. At the same time I feel it incumbent on me to qualify that doubt by adding, that it rests on past experience which in this case is not to be relied on; as the seed hitherto grown on the hills has not been so carefully or judiciously cultivated as he proposes. But still, as the fact of past failure is but too well established, I would suggest for the consideration of the Committee that they, before incurring much expense on this department, have some packets of the seed now in hand tried by qualified persons at some stations on the plains, and be guided by their reports of the results.

In this way a few months will suffice to put them in possession of useful or, it may be, most valuable information, since, should the hill grown seeds be found as true to their kinds, and as certain in their produce, as good English, Cape, and American ones, now obtained at a heavy cost, the supply of this single item of produce will go far towards rendering the garden a self-supporting one, as I presume most persons will prefer cheap and really good Indian grown seed, to costly exotic ones, which must at the same time incur the risk of deterioration during the voyage.

We learn from the report that hitherto the Superintendent has been working at great disadvantage, as regards the introduction and propagation of fruit trees, all of which he had to get from England, in small quantities at a time, and when they arrived, usually so much weakened by the long voyage, that they were rarely fit for propagation until the following year. Keeping these facts in view, we must undoubtedly accord to Mr. McIvor the merit of being both a skilful and industrious propagator, to have succeeded, in so richly stocking the garden with so great a variety of fruit and ornamental trees and shrubs in so short a time.

In connection with this subject I may here advert to two circumstances not alluded to in the report, but which seem to me to merit, at least, a passing notice, even at the risk of our anticipations proving premature. Among the 67 varieties of apples is the Golden-pippin, now almost extinct in England, or I believe I may almost say in Europe, owing to its having become so inveterately attacked with canker, that for many years it has been found impossible to obtain a healthy plant. A plant of it was sent to Ootacamund which has been propagated on Indian stocks. Of many plants thus obtained not one has yet shewn any signs of the disease of the parent; so that now there seems reason to hope that India will in a year or two send back to England this favourite fruit cured of its inveterate disease. If I mistake not Mr. McIvor expects his trees to fruit in the course of next year, by which he will be enabled to test the soundness of his anticipations.

The other circumstance to which I allude appertains to the probability of obtaining from this country, improved seedling varieties of stone fruit. Mr. McIvor brought some peach stones, from England, intending the plants for stocks for grafting finer varieties, but finding the hill ones answer the purpose, allowed the English ones to grow. One has this year borne fruit at Kulhuttee. The fruit, when I saw them a month ago, were still very young, but were then, he assured me, much superior in both form and size to English ones at the same age. This is a promising fact, which is in course of being followed up by obtaining seed of the finest English varieties in the hope of improving upon them.

The report is suggestive on another point, that namely in which it is stated that Cape and Himalayan pines if sown during or shortly before the South-West monsoon do not thrive, but when sown after it is over, do well. This I consider an important observation for, of many hundred plants I raised from seed sown under these circumstances not one attained the height of six inches, while those sown in the garden in September last, are now thriving plants from a foot to a foot and half high. This remark recalls another subject on which it might not be out of place to say a few words, the more so as it is not noticed in the report. I mean the climate of Ootacamund as a fruit growing region.

Ootacamund, owing to its position on the top of the range of mountains which separate the two monsoons, partakes largely of both, but is particularly exposed to the inclemency of the S. W. one, during the prevalence of which the whole plateau of the hills is swept by almost constant cold bleak winds, and drizzling rain, and the sun is obscured by thick clouds. This kind of weather usually continues with brief intermissions from the beginning of June until about the middle of September, and is most unsuitable for ripening fruit. About the middle of October the N. E. monsoon sets in, bringing with it cold, wet and cloudy weather, but less wind than the former. It continues with occasional breaks until the middle of December, and is succeeded by bright sun and cloudless sky, the latter ushering in keen night frosts, sometimes so intense that in the low ground near the garden gate the dry bulb Thermometer within 6 inches of the ground is at sunrise as low as 27° or 5° below the freezing point, and the wet one as low as 20° below that standard. The leaves being constantly wet with dew, the wet bulb seems to furnish the true indication of the cold to which, under these circumstances, they are exposed. Six feet above the ground the wet and dry bulbs at the same time indicated respectively 22° and 29°. Unfortunately the register does not record the rise of temperature *in the sun*, during the next two or three hours, but it is so great that few plants can bear uninjured the rapid alternations from cold to heat. On the higher grounds the cold is less intense, and owing to their sloping towards the west, the reflected heat is less felt, hence the alternations of temperature are smaller, and trees suffer less from that cause.

February, March, April and May, being bright warm months, well fitted for maturing fruit, are to the fruit grower on the hills, what the months of June, July, August and September are to the horticulturist in England. In this difference of seasons lies the great difficulty of cultivating European fruits on the hills. The habit of the trees must be changed, so as to induce spring-flowering trees to flower in autumn, and ripen their fruit in spring. "This problem horticulturists on the hills have as yet made but little progress in solving, and Ootacamund is, on all hands, admitted to be the worst horticultural region on the hills, as regards the production of fruit. Mr. McIvor by varying the seasons of transplanting and grafting, &c., seems to think that he has already to some extent surmounted the difficulty, and hopes it will not be found insurmountable.

In this hope, I trust he may not be disappointed, but I confess that I am far from sanguine. I however, advert to the circumstance on the supposition that the point sought to be gained, that namely, of making trees growing in the open air change their habits, is one of difficult attainment, and with a view to our being prepared in the event of success, to accord to him the full reward of merit. If he does, the residents of Ootacamund will have much to thank him for, as now all their fine fruit is obtained from a zone between 2,000 and 3,000 feet lower down, which being warmer and free from frost is better adapted for ripening it. The Kulhutty garden being situated on that lower level, and having a mean temperature several degrees higher, he there grows grapes, figs, loquats, &c., the Brazilian cotton plant, even, finding a high enough temperature to ripen its crop. That garden is very useful, as an intermediate nursery, for preparing plants for transfer to the warmer climate of the plains, as well as for introducing those fruits too tender to encounter the Ootacamund Climate.

The above, as far as they go, being the simple facts of the case, fully, I think, justify the conclusion that the "promise" of the garden is very encouraging, as giving us ground to expect that both English and Indian horticulture, may, through its medium, be advanced. It now only remains for me to consider as briefly as I can, "its present condition and resources."

On this branch of the enquiry, I do not feel myself at liberty to write with the same confidence, not that I have any doubt of the correctness of the opinions I have been led to form, but because I know that my views are at variance with those of others equally competent to arrive at correct conclusions, if they have taken the same pains to inform themselves of the facts. In a word I am aware that reports to the disadvantage of the garden are in circulation, and have even reached the Hall of the Honorable Court.

These reports having reached me in common with others, I determined, when an opportunity presented, for my own satisfaction, to ascertain how far they were well founded, by examining every part of the works in progress. My family being located on the hills during the hot season, I availed myself of several visits I made to them, during the months of March, April and May, to examine carefully the condition of both the Ootacamund and Kulhutty gardens. These examinations have led me to the conclusion that they are in a satisfactory condition, and that the reports to their disadvantage, however unintentionally on the part of the originators, are founded on error.

My impression is that they must have originated partly in an exaggerated conception of the capabilities of horticulture, but principally in the error of comparing small ornamental gardens, with the perhaps, too large public one. They seem in short to expect that a garden occupying an area of 42 acres (I estimate the size from the plan), all reclaimed for the first time, from waste, can, in the short space of four years, be as fully stocked and rendered as ornamental as a flower plat, scarcely, if at all, exceeding one acre, of previously cleared ground, can be in one year, and that too while hampered with very limited funds.

The report unfortunately does not include a financial statement, but I believe, judging from what I have seen, if the charges be compared with the work done, and the quantity of material introduced, that those conversant with horticultural charges will pronounce the cost very light. Five years ago I recollect the lower half of the garden, represented in the plan by the oval, little better than a peat bog, and the upper a dense jungle. In that short time the lower portion has been drained, levelled, brought into cultivation and planted: the lower slopes of the upper one cleared, intersected with gravel walks, grassed, neatly laid out in flower plats and planted with ornamental shrubs; while those above have been brought into cultivation and variously occupied as indicated in the plan. He has besides cleared another piece of forest several acres in extent at Kulhutty, and planted it as a nursery and orchard for fruits requiring a warmer and more sheltered climate than the Ootacamund garden supplies, and lastly he has taken in two other pieces for seed gardens.

The cost at which all that work has been effected is not stated, but it is to be hoped the Committee will, in justice to the gardener, supply the omission for the satisfaction of Government and the Honorable Court.

Having thus fully stated the grounds on which my opinion rests, I consider it but fair towards those who differ in opinion to state, that at first sight the garden does not seem so prosperous as I have represented it, in as much as it is deficient in ornamental display, a defect sufficiently striking at the time my visits were made, and calculated to convey unfavorable impressions to visitors not prepared by previous enquiries and knowledge of the subject to take into account the difficulties to be surmounted in so rapidly forming so large a garden, in which every thing had to be done, for the first time, from the draining and clearing of the ground it occupies, up to laying it out and stocking it with the profusion of plants it now contains, leaving altogether out of consideration the important fact that the greater part of the materials with which it is stocked were procured from England, and further that the gardener had the mortification of finding successive consignments of seed utterly worthless, thereby throwing him whole seasons behind. Add to these impediments to rapid development, that the trees and shrubs with which the grounds are planted are all young, and it will at once, I think, be admitted, that the defect is in appearance only, simply attributable to want of maturity of the subjects. In such a case time is an indispensable element.

But there is another requisite scarcely less essential, the want of which is much felt—an adequate supply of water. The supply of water is as yet quite inadequate to the wants of a garden so large and so peculiarly situated as this one is. To what extent it can be remedied is a fit subject for the early and anxious consideration of the Committee as it must be evident to every one that the very slender rill which now passes through it is insufficient.

All that portion of the garden represented in the plan coloured, as well as the rhubarb, strawberry, &c., beds, and the ground behind the gardener's house, are a series of steep slopes* off which the rain runs nearly as fast as it falls, hence they are never moistened to any considerable depth. From about the setting in of the frosts,

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* The rise from the pond in the centre of the oval to the top of the garden is, I imagine, not less than from 120 to 150 feet perpendicular.

December until May,* in the average course of seasons, scarcely a shower of rain falls, so that from the time growth is first arrested by the frost until its renewal by the rains, vegetation on these dry banks is in a state of extreme torpor, giving them an arid, sterile and altogether most uninviting appearance. Were there command of water, its application as an artificial substitute for spring rains, so soon as the frosts were over, would in the course of a fortnight, so far as look was concerned, change winter into summer. The growth of the trees and shrubs with which they are now planted would besides be so much expedited as in the course of a year or two to preserve their verdure, by protecting them from the frost, and shading them from the scorching of the unclouded sun at that season. The flower beds on these slopes present an equally sorry appearance at that season, and from the same cause, drought—and until that can be obviated by artificial means, frequenters of these gardens must be contented to forego much of the pleasure the inspection of a gaily decked garden is so well fitted to impart.

Thus then the course of the seasons—the steep slope, and the want of the means of irrigation, all combine to prolong the wintry appearance of the garden long after the warmth and beauty of the weather have led persons fond of gardens and flowers, but who do not take these things into consideration, to expect to find it clothed with its most gay attire. This circumstance, thus easily accounted for, though not so easily remedied, has, I have little doubt, mainly contributed to the unfavorable reports which have gone abroad regarding it, and called for this examination of the grounds on which they rest.

It now only remains for me, in conclusion, to express my conviction, that the obstacles above mentioned may all, to a greater or less extent, be obviated by the skilful application of means, under the judicious guidance and energy hitherto brought to bear on the work by the present gardener, and therefore have no hesitation in recommending to the most favorable consideration of the Committee the propriety of its earnestly soliciting from the Honorable Court an extension of his tenure of office to enable him to bring to maturity the plans now in progress. This I would ask, not as a favor to Mr. McIvor, however well deserved, but as a boon to be conferred on Horticultural science in India.

Trusting that the importance of the subject will excuse the length to which these remarks have extended.

I remain, dear Sir, &c.,
ROBERT WIGHT.

TO MAJOR. F. MINCHIN, *Secretary,*
Ootacamund Horticultural Garden.

BRIEF HINTS FOR THE CULTURE IN INDIA, OF FRUIT TREES, AND THE REARING OF VEGETABLE AND FLOWER SEEDS.

Apples, pears, plums, peaches, and nectarines, cannot be successfully cultivated on the plains, but will succeed in localities elevated from three to five thousand feet above the level of the sea; in such localities, prefer the standard tree to the espalier, but when the elevation exceeds 6,000 feet, the espalier is best suited to ripen the fruit.

Soil, situation and planting.—The above trees succeed best in a deep rich loam, on a rocky bottom or subsoil, not retentive of moisture, and in situations shaded from the rising sun by hills, banks, or even trees (if at a good distance). In localities where the monsoon rains are heavy, prefer planting on hillocks of earth, raised above the surface, and avoid the practice of planting in pits, except the climate be generally dry, and the subsoil gravel, or resting on rock.

Pruning.—The object of pruning is to admit light and air among the branches, to preserve the fruit-bearing parts, and the symmetry of the head, by causing it to spread equally, and to remove such branches as are diseased. In pruning, the parts to be taken away must be carefully separated by a clean smooth cut, close to the branch from which they are removed.

GRAPE VINE.—There are varieties of this valuable fruit suited to almost every climate of India, from the hottest parts of the plains, to the temperate regions of the mountains.

Soil, planting and training.—The soil best suited to the vine, is a compost of the following in equal parts, (well mixed together but not much broken) chunam, rubbish, crushed bones, scrapings of roads, brown turfy loam (as full of grass fibre as can be procured), and stable dung; the loam should be laid up in a long narrow heap for about 6 or 8 months before being used, so that the fibre it contains be thoroughly decayed; on the plains, and all level situations, to prevent the vine borders being flooded during the monsoon, it is necessary to raise them above the surface, which is easily done by rough brick walls, the back wall (to which a trellis work should be attached, sloping about 50 degrees from the wall to train the vines on) 4 feet high, and the front one about 3 feet, the width between the walls 12 feet, and the length according to the number of vines to be planted, the ground should slope gently from the back to the front wall, which ought to be in the pigeon-hole manner, to allow of the drainage water to escape; the entire space between the two walls should be covered over 1 foot thick with rough stones at the bottom, and small ones towards the top, then cover the stones with a thin turf, the grassy side down, to prevent the earth mixing with them, then fill up the space between the walls with the compost above described. On the top of this near the back wall that supports the trellis work, the vines should be planted 7 feet apart, and the young plant cut down to within 3 buds (or eyes) of the ground, these three buds will then begin to grow; as soon as they are long enough, select the two best, and train them horizontally along the lowest rail of the trellis, and when each shoot has extended 3 feet, turn them up the lattice work in a perpendicular direction for 3 or 4 feet or more, according to their strength, then the top must be pinched off, and all side branches that may be produced must also be pinched off above the first leaf.

In the dry weather, when the leaves fall, each shoot is cut off where it was turned upwards; when the plant begins to grow again, all the buds along the horizontal part will make shoots; select from these 7 shoots, one at the extremity, a second a foot from that, and a third a foot from the second, the fourth in the centre, or where it was first headed down, and three on the other horizontal branch; these should be trained perpendicularly till they reach the top of the trellis, which may be 7 or 8 feet high, they should then be stopped by pinching off the top, and treating all lateral or side shoots that is produced as before directed.

When the leaves fall the 3d year, each alternate shoot is cut down to within 2 eyes of the horizontal stem, and the others left 5 or 6 feet long to produce fruit; when they begin to grow again, the best shoot is selected from those that had been cut down to two eyes, and trained up to the top of the trellis, and treated in every respect as before.

The next year, when the leaves fall, they are cut down to about 18 inches under the top of the trellis, and those that had produced fruit are cut down to within two eyes of the horizontal stem, and so on, for any number of years.

FIG.—Like the *Vine* there are varieties of the fig suited to almost every climate of India.

Soil, planting, pruning and training.—The fig requires a light rich soil, thoroughly drained, and on that account should always be planted on hillocks 10 feet apart, the bottoms filled with stones and the soil laid over them. The fig requires no pruning, further than is necessary to keep it in shape, and to remove all suckers by cutting them clean off where they are produced; when the tree grows too luxuriant, it should be trained horizontally on espalier rails, which will induce it to produce fruit, but generally it succeeds best as a standard.

REMARKS.—All fruit trees require to be abundantly supplied with water, as soon as the first leaves begin to expand, and until the fruit sets; when the fruit begins to color, water should be given sparingly, and when it is nearly ripe, withheld altogether. The vine grape (and some others) will not set fruit, if the weather is wet at the time of flowering, therefore if the vine naturally come into flower in wet weather, the time of flowering must either be retarded by thatching the border with straw, so as to prevent the water getting to the roots, and thus causing vegetation, or accelerating growth by watering, so that they may come into flower and set their fruit before the rains. All soils should be mixed when in a dry state, and the trees planted when the weather is cloudy and wet.

REARING OF SEEDS.

Soil and preparation of.—Prefer a light sandy soil, free from salts, thoroughly drained, and well enriched with stable manure, which should be soaked in a pit of water for at least a month previous to being used, to destroy the grubs, and larva of insects.

Time of Sowing.—In most localities sow early in December, except in such as the north-east monsoon rains fall heavy in that month, in which case it is best to wait till the heaviest of the rains are over; in a few places July and August are the months best suited for sowing.

Sowing.—Prepare seeds for sowing, by soaking such as the acacia tribe in boiling water for a few hours. Peas, beans, beet, and other large vegetable seeds in cold water for 5 or 6 hours, and sow immediately after; carrots, turnips, parsnips, &c., should be sown in drills 20 inches or 2 feet apart, when they are to remain, all the cabbage and lettuce tribes, &c., in seed beds, and transplanted when about 2 inches high.

Seeds when sown are covered with soil in proportion to their size, beans and peas from 1½ to 2 inches, cabbage, &c ¼ of an inch, small flower seeds are covered with a thin coat of sand. To keep the beds moist and shaded as soon as the seeds are sown, lay all over thin branches of trees having small leaves.

Watering.—Water sparingly with a watering pot for the first 5 or 6 days after sowing, tank water to be used if procurable in preference to that from wells; flooding the soil by running water over it should be avoided.

OOTACAMUND: W. G. McIVOR,
4th May, 1853. *Superintendent, Hortl. Gardens.*

Report of the Committee appointed by the British Association to consider the probable effects in an economical and physical point of view of the destruction of Tropical Forests. By DR. HUGH CLEGHORN, *Madras Medical Establishment; Professor* FORBES ROYLE, *King's College, London; Captain* R. BAIRD SMITH, *Bengal Engineers; Captain* R. STRACHEY, *Bengal Engineers.*

As preliminary to the Report which your Committee has now the honour to submit, we have to make the following remarks. The great extent of the subject prescribed to us, involving as it would have done, if completed in its integrity, the collection of materials from every tropical region on the surface of the globe, would have involved an amount of labour which we had neither the time nor the means of devoting to the subject. Three of our members had special duties required from them, which did not admit of being in any way postponed,* and it has been consequently on the fourth (Dr. Hugh Cleghorn) that almost the entire labour has devolved of collecting and digesting the materials now laid before you †

The personal relations of the whole of the members of your Committee with the Tropical Regions of British India, naturally suggested to them the propriety of limiting their researches to that field wherein they had themselves been employed, and with the circumstances of which they were not only best acquainted, but had also the best means of filling in any imperfections which might exist in their knowledge. The subsequent report has accordingly reference solely to the Forest Question as applied to India, and we have endeavoured to collect all such information as would illustrate the physical and economical effects of the destruction of the natural woods, which in that, as in other countries, are of such admitted importance.

In reference to the physical effects of the removal of forests, we found considerable variety of opinions. There is, it must in fact be admitted, a deficiency of *exact* or experimental information on the subject. Observations of a *precise* character on climate in countries once covered by forests but now cleared, do not to our knowledge exist, and the evidence with which we have to deal is a kind of evidence which admits of considerable variety of interpretation. Of such evidence we have exhibited a number of examples, and the general conclusions which appear to be warranted by these may be perhaps best given in the following words of Humboldt, the most eminent authority who has discussed the question :—

"By felling trees which cover the tops and sides of mountains, men in every climate prepare at once two calamities for future generations—the want of fuel, and the scarcity of water...... Plants exhale fluid from their leaves, in the first place, for their own benefit. But various important secondary effects follow from this process. One of these is maintaining a suitable portion of humidity in the air. Not only do they attract and condense the moisture suspended in the air, and borne by the wind over the earth's surface, which, falling from their leaves, keeps the ground below moist and cool; but they can, by means of their roots, pump it up from a very considerable depth, and, raising it into the atmosphere, diffuse it over the face of the country. Trees, by the transpiration from their leaves, surround themselves with an atmosphere, constantly cold and moist. They also shelter the soil from the direct action of the sun, and thus prevent evaporation of the water furnished by rains." In this way, as Humboldt states, the forests contribute to the copiousness of streams.

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* Professor Royle has been engrossed with the Exhibition and his other duties. Capt. Baird Smith has been employed on duty abroad, and Capt. Strachey was digesting his own Himalayan researches for the press.

† In drawing up the Report, it was necessary to alter and compress the language of the original documents; but care has been taken to give the opinions of the authors as nearly in their own words as possible.—H. C.

The question as between the maintenance and removal of forests appears to us to be a question of compensations. Wherever the progress of population requires that every portion of the soil be made to yield its quota of human food, there the destruction of forests is to be desired, and the disadvantages to which want of wood for social and general purposes may lead must be compensated for, as they doubtless will be, by the ingenuity which is born of necessity. But there are localities in nearly all countries to which the tide of population can never flow, but where the forests can flourish, and where it ought to be maintained. To tropical countries, the preservation of the springs which feed the rivers, on which the fertility of the land and the prosperity of the people are so essentially dependent, is of the greatest importance. These springs rise in the mountain regions where forests prevail, and it is to such regions that a protective agency should be extended, for there can be but little doubt that the entire removal of wood leads to the diminution of water. In a single sentence, we would say that where human exigences, whether for subsistence or for health, require the destruction of forests, let them be destroyed : but where neither life nor health is concerned, then let a wise system of preservation be introduced and acted upon.

The planting of such trees as are desirable from the fruit which they afford, or grateful from the shade which they yield, is an act which has been held in high esteem in eastern countries, especially India, from very early times. The eastern appreciation of the luxury of shade led to the banks of the canals, constructed by the Mahommedan emperors, being planted, and the waysides of the imperial roads being lined with trees of various kinds ; in the Sunnud of the Emperor Akbar, it is directed, "that on both sides of the canal down to Hissar, trees of every description both for shade and blossom, be planted so as to make it like the canal under the tree in Paradise ; and that the sweet flavour of the rare fruits may reach the mouth of every one, and that from those luxuries a voice may go forth to travellers calling them to rest in the cities where their every want will be supplied."*

But the planting of trees for timber seems to have been neglected there, as it has been in most other countries, until modern times. This is no doubt owing to self-sown forests being more than sufficient to supply all the wants of man in the earlier states of society. As population and civilization are advanced, such forests are looked upon rather as impediments to agriculture, than as sources of wealth, and the means of removing trees are more thought of than the readiest modes of propagation, or how they should be treated so as to produce the best timber in the shortest time, and in the fullest quantity that the ground is capable of bearing, and so managed that it may yield some profit even while the timber is growing.*

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* *Calcutta Review*, No. 23.

British India is so extensive an empire, so diversified in soil and climate, as well as in natural and agricultural products, that it is impossible to predicate anything respecting it generally; that which is descriptive of one part, is not necessarily applicable to another. Thus some parts are covered with primæval forests, as the mountainous coasts of Canara and Malabar, the country surrounding the Neilgherries, the Tenasserim Provinces, much of Central India, the base of the Himalayan Mountains from Assam up to the banks of the Ganges, as it issues from the hills, and beyond it: while other parts are not only bare of trees, but even of vegetation of any kind, as the deserts which run parallel with the Indus, and stretch more or less into the interior of India. The North-western Provinces, as well as many parts of the Peninsula of India, are generally bare of timber-trees, as are also the highly cultivated Southern Provinces of Bengal. But in most parts of India clumps of trees may be seen by the traveller in every direction in which he can look. This is owing to the Indian practice of embowering every village in a clump or tope of trees, generally of the Mango, but frequently the Bur, Peepul, Tamarind, &c., are found, some yielding fruit, others grateful for their shade, and some yielding fodder for elephants and camels. In the neighbourhood of every village also may be seen tracts of jungle, more or less extensive, which by some are accounted so much waste land. They are often composed of long grass, or of low shrubs, as the Dhâk and wild Jujube, with a few trees intermixed, as the Babool and Seriss. These tracts, though disfiguring the rich appearance of a cultivated country, are far from useless, as they form the only pastures which the natives possess for their cattle, as well as their whole source of supply for firewood, and whatever timber may be required for the building of their huts or the making of their agricultural implements.

From the number and extent of the forests and jungles of India, it might be inferred that timber was abundant in all parts, not only for home consumption, but that a supply might be obtained for foreign commerce: this is far from being the case. Though forest lands are extensive, their contents in accessible situations are not of a nature, or sufficiently abundant, to supply even the ordinary demands. In India, as in other long inhabited and early civilized countries, the parts best adapted for agricultural purposes have long been cleared of jungle. The forests lying nearest to the inhabited tracts were first stript of their timber, and as no precautions have been taken to replace the old trees, a gradual diminution has been observed in the supply of timber, which has consequently increased in price (as may be seen in the Government contracts for building, and the Commissariat outlay for firewood), not solely from actual deficiency, but because timber is only obtainable from less accessible situations, with considerable increase of labour and expense.

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* The substance of the above and following paragraphs is extracted from a valuable MS. Report of Dr. Royle on the advantages of increased planting in certain districts of India.

As the principal cities, where the greatest demand for timber exists are in the centre of cultivated tracts, so are they necessarily remote from the forests from which they require wood, either for the construction of houses and machinery for ship-building, or other purposes. Hence a commerce in timber has long been established in India. Calcutta and the cities situated on the Ganges are supplied with timber grown in the forests which skirt the foot of the Himalayan Mountains, from Assam to the banks of the Jumna. These supplies are floated on rafts down the numerous feeders of the Ganges, which forms the great artery of the plains of India. But this is not sufficient for the consumption of Calcutta, as considerable quantities are imported from the Burman Empire. In the same way there is an insufficient supply for the Madras Presidency, which is made up by importing timber from Ceylon.

Bombay has long been celebrated for the building of ships with teak-wood, supplied from the forests of Malabar and Canara, whence timber seems always to have been exported even to Arabia and Persia.

Looking at the extent of India, and reading of its interminable jungles, it may seem a work of supererogation to talk of the deficiency of timber, or of the necessity of protecting its forests. Timber to be valuable must be of the proper kind, of the proper age, and at proper distances, that is, inaccessible situations. As might have been expected, from continual drains being made on these forests, without adequate measures having been adopted to keep up the supply, a continued and increasing deficiency has been experienced in all parts of India, which has frequently attracted the attention of the Indian and Home Governments, so that in the Bombay Presidency numerous reports have been made on the state of the teak forests, and measures adopted for their improvement, without as yet much benefit.

In the Madras Presidency steps have at different times been taken to encourage planting, as in the time of Dr. Anderson ; and lately we have seen the Madras Government applying annually to Bengal for the seeds of Saul and Sissoo, for planting in Madras. These have been very successfully introduced and acclimated in the territories of Mysore and other southern provinces. In a letter from Capt. Onslow to Dr. Cleghorn, dated Shemogah, 21st July, 1847, that intelligent officer writes in reference to a plantation on the banks of the Toombudra,—"I have never seen any vegetation so wonderful as that of the Sissoo : last year's seedlings are almost too large to transplant. It would be a pity to allow the monsoon to pass over without putting in more seed." The Mahogany *(Swietenia Mahogani)*, a tree of great value and beauty, has been introduced successfully into the Calcutta

Botanic Gardens, and a few specimens are thriving at Madras and in Mysore, giving promise of its being nearly equal to the finest varieties from the Honduras. Specimens of furniture prepared by Dr. Wallich from trees grown at Calcutta are now in the museum at the India House.

Dr. Wallich was despatched in 1825 to the Upper Provinces, in order to inquire into and watch over the extensive forests of the empire, which were found to be undergoing most wasteful and rapid decay. Three MS. volumes of reports and proceedings, with two original maps of the route taken by Dr. Wallich and Captain Satchwell, were placed by the Supreme Government with the Agricultural and Horticultural Society "*for information and deposit.*" These volumes contain the labours of a body of public officers, which, under the denomination of "THE PLANTATION COMMITTEE," originated under the administration of the Marquis of Hastings and continued in existence six years. The records of its proceedings, as contained in these volumes, extend over 1070 pages of manuscript. They contain much and most valuable, indeed generally unknown information, bearing on the great practical measure of forest cultivation, the Sissoo localities in particular; and every effort should be made to rescue this information from oblivion. The late Dr. Spry, Secretary of the Agricultural and Horticultural Society, was desired to undertake the examination of these records, and favour the Society with a report upon their contents. He devoted much time to this duty, and reported in July, 1841, that the really valuable part of these papers might be condensed into a small-sized volume of about 250 pages. The work of condensation, that is the compilation, so as to avoid the official forms in which the information is introduced, that the matter may be brought into a continuous form, will necessarily be great and require that some specific allowance be made for its performance. The carrying out of this proposal was committed to Dr. Spry, and had his life been prolonged, would have been executed by him. We regret that the fulfilment of his intentions has not devolved upon any of his friends, considering the importance of giving publicity to such valuable information, and we still think the matter deserving of recommendation to Government. Dr. Wallich has borne testimony to the value of the information, and stated that if the undertaking be sanctioned, he would be most happy and willing to give his valuable assistance in the work of publication.

"The reports of Dr. Wallich are particularly valuable respecting the natural forests, both of those within the British territories in India, and also those of the neighbouring powers. In his visit to the Turai, or low and moist forest-land skirting the base of the Himalayas, he particularly recommends a vast extent of forest-land in Oude, situated on the east side of the Kowreala river, as holding out the prospect of very valuable supplies, provided that means are adopted for preventing wanton destruction, and of allowing the young plants to grow up and supply the place of those which are cut down. Among the forests in our own provinces, Dr. Wallich adverts particularly to those occupying the Islands of the Gogra, commonly called Chaudnee Choke. He represents them as extremely important, and in every way deserving of being preserved for the exclusive use of the Government, and especially of being emancipated from the destructive depredations which are annually committed. The Sissoo and Saul forests of the Deyra Doon are also recommended to be preserved for the use of the service, though from these the facility of transportation is represented as not equal to that from the other quarters previously mentioned. But they are nevertheless as important for the stations in the north-west of India as the forests of Oude and Gorukpore are for those in the south. As considerable deficiencies of timber, at least of those kinds usually employed, such as Saul and Sissoo, besides Bamboos, had been experienced, and as the deficiency every day increased, Dr. Wallich was induced to recommend that Government should interfere in the management of the forests; for the natives, from their extremely injudicious mode of felling forests, cut and carry away all that are easily accessible, both young and old plants, without planting any thing new in their place, or encouraging the growth of the young seedlings. Another great defect in the native mode of managing timber, is their total neglect of any regular system of seasoning:—timber ever being seasoned by them at all, depends upon the proprietor not having been able to sell it."—*Royle's Prod. Resources of India*, p. 189.

The glory of the Malabar and Tenasserim forests is their teak, the vast importance of which is becoming daily more known and appreciated; the timber indeed has been long prized. Bontius described the tree under the name of *Quercus Indica*, though except as regards the timber, it has no resemblance to the Oak. Rhæde has given an accurate representation of *Tectona grandis*, and refers to the teak forests of Malabar in these terms (Hort. Malab., iv. t. 27):—"Crescit ubique in Malabar, at præsertim in provincia Calicolan (Calicut) ubi integræ sylvæ ingentium harum arborum, reperiuntur.* * * Lignum vero hujus arboris quercino ligno haud absimile, operi fabrili accommodum, atque naupigis ad navium fabricam in usu est: sed in aquis (præsertim dulsibus) teredini facile obnoxium."

It will be shown that these large forests, supplying the *finest sort* of teak, had fallen long ago into a deplorable state, both old and young trees having been indiscriminately cut down, without regard to future supply.

"This work of destruction," according to John Edye, Esq., (*As. Soc. Journ.* ii.), "is conducted by a company of Parsee merchants, who take a certain number of the natives from Mangalore at the proper season for felling, and, without consideration for the future, cut all sorts of poon-spars, saplings as well as large trees, to the great injury of the forests. There were hundreds of small spars from five to nine inches diameter, and thirty-five to seventy-five feet long, actually decaying on the beach at Mangalore at the time I was there; from which circumstance in the course of a few years these valuable forests must be exhausted. The whole of this trade is in the hands of a combined party of these people, who never fail to take advantage of any particular demand that may occur."

In Wight's 'Illustrations,' vol. ii., just received, he remarks,—"The timber of the *Tectona grandis* is about the most highly esteemed in India, that of nearly all other trees is spoken of as jungle-wood and inferior. Time does not now permit, otherwise some remarks might have been offered on the subject of the preservation of the teak forests, and the recent fearful waste and destruction of that valuable, I had almost said invaluable, tree in all our teak forests, without a single step being taken either to keep up the stock or preserve young trees from the ruthless hands of contractors and others licensed to cut teak timber. Measures are now, I believe, in progress to arrest the ruinous destruction that has for some years been going on, and it is hoped that the Directors will succeed in their object; otherwise the stock in hand will soon be exhausted."

The following extract is from a private letter of Dr. Macfarlane, late Zillah Surgeon, Mangalore:—

"For the Canara forests, I can testify from personal observation as late as December, 1849, that Coomree clearing was being carried on to a most destructive extent in those tracts surrounding the falls of Gair-soopah. As far as I could get any information on the subject from Lieut. Walker of the Engineers, who is employed in the district of Canara, and with whom I visited an extensive Coomree inclosure near the Deva-munny Ghaut, no check seems to be exercised over the forest population in this respect. Lieut. Walker's description to me was, that the jungle people ringed the trees to kill the large ones, took the branches and made a fence against wild animals, burnt as much as they could, and then took one or two crops of millet (or ragee) out of the soil, going over to another tract and repeating the same practice. All around in that primæval forest, thousands of acres were, or had been, evidently under *Coomree*, the large timber-trees destroyed, the spaces left blank in the forest, and in all these Coomree spaces that had again been left to nature, I could not help remarking that wild plantains invariably sprang up in myriads."

The extensive forests of teak mentioned by Buchanan in his 'Journey through Mysore in 1800,' have well nigh disappeared, as will be seen by the details in the following Report:—

"Nuggur Division, Superintendent's Office, Shemonga,
5th May, 1847.

"To the Secretary to the Commissioner of the Government of the Territories of the Rajah of Mysore.

"Sir,—In connection with the subject of my letter of the 11th March last, there is another, unquestionably of great importance, now occupying the attention of the Government of India, and which I am confident will at once engage the attention of the Commissioner,—I allude to the conservation of the forests as regards timber, the value of which might with care and attention be made very important in Nuggur. From want of these, nearly all the fine teak and other timber which once flourished on the banks of the Toonga and Bhudra rivers have disappeared, and the Government has derived but very little benefit from it.

"2. Vast quantities of various kinds of timber are yearly carried down the Toongabhadra river to the open country, by people who pay a small sum to the farmer of the forests for the privilege of cutting it. In the months of August and September these people take down hundreds of floats made of bamboos loaded with timber. Teak, black-wood, and ebony are forbid to be cut; but I am well assured that these prohibited timbers are taken away in great quantities every year; we have no means whatever of preventing it.

"3. The forests are rented yearly to the highest bidder; the renters, holding their farms for a year only, have no interest in preserving the forests; on the contrary, their interests are best served by their destruction. They make their profits by taxing the timber-cutters and Coomri cultivators; therefore the more jungle there is cut, the greater are their profits. The consequence of this indiscriminate cutting is the total disappearance of teak in localities where it formerly abounded, especially in the vicinity of the river Toonga. Buchanan in his 'Journey,' says at vol. iii., p. 287, 'Here (*i.e.* between Teerthully and Mundagudda in the Cowledroog Talook), were many fine teak trees, more indeed than I have ever seen in any one place. They might be of value could they be floated down the Toonga to the Krishna, and so to the sea.' This is after he had seen the Soonda and other fine forests in Canara. When at the same place in February last I saw no teak, and I saw none the whole length of the river as far as Mundagudda.

"4. There is some teak remaining in the forests near Mundagudda about twenty miles from this, but it is fast disappearing, and in a few years there will be none within the reach of the river. Teak is occasionally cut on account of Government, brought to Shemoga, and sold; but it does not bring a good price. The average amount of sale for the last five years is Company's rupees 181-6, as is shown in the accompanying statement, which exhibits also the average of each item of revenue, the produce of the forests for the same time, and a total average of Canteroy pags. 1,168-5, or Company's rupees 3,397-4-2 annually.

"5. This is all the revenue that the magnificent forests of Nuggur are made to yield by the present system, which is fraught with mischief. There is no preservation of the timber that stands, nor encouragement of the growth of young trees; and at the present rate of destruction there can be no doubt that in a few years there will be no valuable timber left in places from which it can be carried away.

"6. But this is by no means the only evil: Coomri cultivation is mischievous in various ways. The following are some of the most prominent objections to it. It causes the most rapid destruction of the forests, which, it is a well-ascertained fact, lessens the quantity of rain and moisture, and must thus, in the course of no very long time, seriously affect the cultivation and prosperity of the country. The cultivation of the Mulnaad* is solely dependent on rain (there being no irrigation,) and requires abundance of it. The people of the Mulnaad begin already to remark that there is a diminution of rain: and I think it highly probable that it is attributable to the vast extent of Coomri clearings all over the country, but especially along the crest of the Ghauts. Looking over Canara, immense tracts of Coomri are to be seen as far as the eye can reach. Some weeks ago I went down the new Ghaut leading from Hunnaur, above the Ghauts, to Colloor in Canara, and was much struck with the immense extent of Coomri. I saw tens of thousands of acres cleared on the hills. The new pass is six miles long, and is entirely through clearing, where not a single forest-tree is left standing. In these clearings, the primæval forest, with all its beautiful timber and valuable productions, has given place to a thick scrub of noxious weeds and brambles, containing nothing useful. It may be supposed that clearing the forest would make the country more healthy, and so it would if the clearing were more permanent; but the forest is now destroyed only to be replaced by a thick jungle of rank vegetation, still more unhealthy than the forest, which being open below, admits of circulation of air; but the scrub is a dense mass of vegetation, and from bottom to top it is about twenty feet high. But however this may be, I think it is a question worthy of serious attention, whether the present unlimited destruction of the forest shall be allowed to continue, risking the diminution of rain, the effect of which would extend over the whole of the southern part of the peninsula, and perhaps occasion most disastrous consequences.

"7. More inland, Coomree cultivation is destructive of much sandal-wood. There is now a case under inquiry in the Shikarpoor Talook, in which eighty trees have been destroyed. The average value of a sandal-wood tree is from five to fifteen rupees. In the coffee districts this system is very objectionable. Coffee will not grow in a Coomri clearing, the soil having been exhausted, and the fires in the neighbourhood of plantations endanger it. The Coomri cutters would be much better employed in the plantations. Upon a representation of these objections, I forbid Coomri in the Chickmoogloor Talook some months ago.

"8. This cultivation has great attraction to the lower classes of cultivators and labourers; it leads numbers from the cultivation of the berizlands, and thus directly injures the revenue, and produces in those who take to it lawless and vagabond habits. Along the Ghauts the Coomri cultivators, when not engaged in their cultivation, employ themselves in smuggling, which the clearings and their knowledge of the country greatly facilitate. In the Mulnaad a trifling rent is paid to the forest-renter. In the open Talooks a low rent is paid directly to Government. In either case the payment of it is often evaded by those who have clearings in remote and inaccessible parts, where they are not easily discovered. The cultivation is of the rudest and simplest mode. The trees are felled in January and February, and allowed to remain in the ground till the next season, when they are burnt. The earth is not turned at all, and the seed, ragee, castor-oil, or dholl,* thrown broad-cast upon the ashes among the stumps. The crops thus produced are always abundant. Formerly the practice was to take only one crop, and leave the clearing, which allowed the stumps to shoot out again, and the same spot would bear cultivation again after from twelve to twenty years. But of late the practice of repeating the process the second year has grown up. The same clearing will bear cultivation again after from twelve to twenty years: when it has been cultivated for only one season the stumps of the trees shoot out again if only once cut and burnt; but if this is done a second year, they perish, root and branch, and the spot is ever after productive of nothing but scrub. The soil has been totally exhausted, and produce nothing but weeds. It is probably this practice, which did not formerly [illegible] t, that has caused such extensive destruction of the forest.

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* *i. e.* Rain-Country.

"9. Coomri cultivation is therefore directly injurious to the revenue; it has a demoralizing effect upon a great number of people, and is in all respects objectionable, except under the circumstances explained in the following paragraph. The renting system is unproductive of revenue and destruc [illegible] of the forests; I am therefore of opinion that it ought to be abolished, [illegible] the forests should be kept in the hands of Government and preserved, [illegible] that Coomri should be altogether forbidden, except under strict supervi[illegible] and the orders of the superintendent.

"10. There are some parts of the country where clearing the jungle might be done with great advantage in many ways. There are extensive ranges of jungle composed of bamboo and stunted trees, which are quite unproductive and the clearing of which I would encourage. The people might be taught to clear and cultivate [illegible] land in a way which would not be destru[illegible] its powers. There are immense ranges of this kind of jungle betwe[illegible] moogloor and Belalryandroog, and in the Luckwolly Talook, to the we[illegible] the Bababooden Hills, which produce nothing whatever, and are very healthy. In other parts, more to the east, there are similar jungles, which produce sandal-wood. In these, Coomri could be allowed, care being taken of the sandal-wood. It is along the Ghauts where I think Coomri is particularly objectionable; there the forests are composed of fine timber-trees, hold many valuable productions, and are perfectly healthy; and it is there where the formation of rain would be most affected by clearing the forest.

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* *Eleusine coracana, Ricinus Communis* and *Cajanus indicus.*

"11. To bring out the value of the forests, not only should that which exists be preserved, but considering the vast importance of its timber, teak should be planted, as is done in other parts of India. Hearing of the successful planting of teak in Malabar, I applied to Mr. Conolly, the collector, for information, and he has been kind enough to send me a memorandum of his method of planting, which he tells me is most successful; I am confident that the same could be done in many parts of Nuggur, in the most favourable positions along the banks of the Toonga and Bhudra rivers, where teak grows spontaneously, and where, from the facility of transportation afforded by the river, it would become very valuable. I annex a copy of the memorandum I have received from Mr. Conolly. I have collected a quantity of teak-seeds, and the [illegible]ghorn undertake to raise seedlings here, which I purpose to plant as an experiment along the banks of the Toonga, between Shemoga and [illegible]lagudda, where formerly teak grew large and abundantly.

"12. Should the commissioner sanction my proposal to preserve the forests and form plantations of teak, it will be necessary to keep up a small establishment. Perhaps the following would be sufficient for the present:—One Daro[illegible] on 6 rupees per month, and twelve Carnatties on 3 rupees. It is desirable not only to plant young trees, but to facilitate the growth of the spontaneous seedlings, by clearing away obstructions. Buchanan remarks on this subject, in the same paragraph that I have quoted above, 'I know of no place that would answer better for rearing a teak forest than the banks of the Toonga, where close to the river there is much excellent soil, which is considered as useless, as there are on the spot many fine teak-trees. All that would be required would be to eradicate the trees of less value, which I look upon as a necessary step to procure any considerable quantity of teak in a well-regulated government. This remark is perfectly applicable to the locality I have in view, which is twenty miles lower down the river than the place he alluded to.

"I have, &c.,

(Signed) "W. C. Onslow, *Superintendent*.

"'The depredations of wood-cutters seem to have suffered no check until the last year, and I fear the means taken are still very insufficient to prevent indiscriminate havoc. To give you some idea of the waste of valuable and ornamental timber in this country, I will just mention what I discovered at Hyderabad. I was in want of light-coloured wood for picture-frames, and applied to the regimental contractor: what was my surprise to find that every third or fourth log in his great store of firewood was most beautiful satin-wood of large size! Only imagine the victuals of a whole regiment, not to say of a large community, being cooked with satin-wood! On this fact becoming known, applicants for the satin-wood became numerous. I consider it nearly equal to the bird's-eye maple for ornamental work.

"'Capt. Harvey, *in literis*.'"

In the following extract of a letter from Dr. Wight to Dr. Cleghorn, dated Coimbatore, 3rd April, 1851, it is well observed,—" As to the destruction of forests, it appears to me that there can be but one opinion on the subject, and that is, that it is most injurious to the welfare of any country, but especially of a tropical one, and ought upon no account to be tolerated, except where the ground they occupied can be turned to better account, and even the entire denudation should be avoided. I am not yet prepared to admit that trees have the property of attracting rain-clouds, and thereby increasing the quantity of rain that falls ; but there can be no doubt that they increase the retentiveness of the soil, and moreover keep it in an open absorbent state, so that in place of the rain running off a scorched and baked soil as fast as it falls to the earth, it is absorbed and gradually given out by springs. I am not prepared to go so far as to say, that forests, especially on high hills, have not the effect of attracting rain-clouds, but I am quite sure that if they, to ever so small an extent have that property, the benefit is augmented a hundred-fold by their property of maintaining an open absorbent soil.

" On this ground it is that I should like to see this country extensively planted, especially on all the elevated lands, because water absorbed in elevated grounds forms springs in the low ones : you truly say, that short-sighted folly has already done much mischief, and the ryots have suffered to an immense amount. This is most true, but the difficulty is to put the saddle upon the right horse. Who has done the mischief ?

" Within about fifty miles of the spot whence I write, a tract of country has been cleared ; the result is that the inhabitants are now so much distressed for the want of water, that they contemplate leaving the country, their wells being all dry. On inquiry, it does not appear that the rains have fallen below the usual average, but notwithstanding, the country has become so dry that wells no longer provide a sufficient supply of water.

" Major Cotton, from whom I have the information, attributes it to the rain running off the baked soil as fast as it falls, in place of sinking into the earth and feeding springs. The subject is now attracting attention, and doubtless before long it will be ascertained whether forest has the effect of augmenting the fall of rain, or whether it results from the increased capacity of the soil for moisture. If the former, it is to be hoped that extensive plantations will be had recourse to as a means of equalizing the monsoons ; and if the latter, that it will be adopted as a means of retaining the water that falls from the clouds."

Concerning the vast forests on the opposite side of the Bay of Bengal, the principal observers, so far as we can learn, have been Wallich, Helfer Griffith, Blunden, Seppings, and O'Riley.

Dr. Helfer, who has written a Report on the Tenasserim Provinces, speaks of the Teak as furnishing one of the greatest riches of the country, and being the foundation of all those improvements which have followed our acquition of it. He informs us that many trees perish by bad management; that many trees which are killed are not found subsequently fit for use; that they are suffered to decay, and generate a host of insects, which attack good trees before they are seasoned, and that much timber is wantonly destroyed. "The same negligence of the natives which reigns throughout the country, with regard to wanton destruction of the forests by fire, extends equally to teak forests: and I saw extensive tracts utterly destroyed, because it was the pleasure of some wild Karean to fix his abode in the vicinity, and for this purpose to clear the jungle by burning all down.

"As teak is a valuable article in general, and it may be safely asserted, hitherto the only one to which Moulmein owes its daily increasing prosperity, the preservation of teak forests should be the principal care of government."

The following observations are extracted from a paper by Mr. O'Riley, in a recent number of the 'Journal of the Indian Archipelago:'—"At the head of the vegetable productions of spontaneous growth of these provinces, the Teak of its extensive forests holds the most prominent place; forming as it does, the only staple article of commerce that has as yet undergone any degree of development, and upon which the interests of the port of Moulmein have arisen, and steadily progressed to their present scale of importance.

"Many obstacles oppose themselves to the attainment of an accurate knowledge of the actual resources of the teak localities; the most important, and the only insuperable one, being the excessive unhealthiness of the forests, which possess an atmosphere loaded with malaria, and fraught with fever to all persons unused to its baleful influence. Since the demand for teak-timber for the home market has been created, it will be apparent from the following statement of the exports from 1840 to 1848, that the quantity to be obtained is fully equal to the demand for it; and this is more evident from the circumstance of there being at the present time a stock of rough logs equal to 15,000 tons of converted timber, which has not yet passed the general department, the absence of a demand preventing the holders from paying the duty upon it.

Exports of teak-timber for the years from 1840 to 1848 inclusive.

1840	4,952	tons.
1841	6,399	"
1842	11,487	"
1843	10,528	"
1844	14,245	"
1845	13,360	"
1846	16,798	"
1847	11,250	"
1848	18,000	"

To which may be added 3,415 tons appropriated to ship and house-building, and other purposes, giving a value, at the rate of 40 rupees per ton, of

Company's rupees 869,800, as an annual amount derivable from this commercial staple of Moulmein.* * * * For the due encouragement of the timber trade in the first instance it was deemed advisable to grant licences to cut teak within certain ill-defined limits to parties connected with the trade of the place, which teak, on its arrival from the forests, was subjected to a certain rate of duty.

"For the preservation of the forests, certain terms were demanded by Government from the holders of licenses, to the effect that trees below a standard size were to be left, and for each full-sized tree felled, a stated number of young trees were to be planted, the latter from experiment having been found to be impracticable. With so frail a tenure, it might have been anticipated that the holders of such licenses, perhaps without any large amount of capital available for forest purposes, would endeavour to realize the largest possible amount of benefit at the least possible outlay, *without reference to the ultimate productions of the forests*; hence the system of sub-letting supervened, as being the most congenial means to the end; and the result of such measure has been the working of the forests by Burmese, who receive an advance on a contract to pay to the holder of the cutting-license the half of the timber on its arrival in Moulmein. To the same cause must be assigned the reckless destruction of property, which has become a system in the extraction of the timber from these forests. Many of the trees being of the largest size, and admirably adapted for ships' masts, are for the sake of convenience and expedition in their transport to Moulmein, cut into lengths of more manageable dimensions, say from fifteen to twenty cubits, and in this form of log depreciate the value of the original spar to *one-tenth* of the amount it would have realized as a ship's mast! No excuse can be admitted in extenuation of this effective process of working the forests; the most powerful and effective animal power, in the shape of elephants, (which are in general use in the forest work), is abundant and cheap, and if to that power the simplest European mechanical appliances were systematically applied with ordinary skill and management, the British navy might be masted from the teak forests of these provinces.

"Whether it be found expedient to reserve the forests as a government property exclusively, or on the other hand, granting right of property in perpetuity to the holders of forest licenses on certain well defined terms, and thereby enlist their pecuniary interest in the preservation of the tree, and improvement of their grants,—whether either of the foregoing form the basis of the ultimate measures of Government, it must be evident that in the establishment of a well-organized system of administration, instead of the present obviously defective one, permanent good must result.

"The subject of teak-timber has claimed the attention of several public journals of late, in consequence of some disclosures made in the proceedings of the Government dock-yard of Bombay, and *all are unanimous* in directing attention to it as a most important commodity, demanding the most stringent legislation to secure supplies for the future from the British possessions equal to the growing demand for it, as a staple, thus noticed by the 'Friend of India':—'The amazing durability, we might almost say indestructibility of teak, renders it not only one of the most valuable, but *the most valuable wood*, in a climate like that of India, where the elements of decay are so numerous and powerful, where dampness brings on rapid corruption, and the white ant devours without scruple.'

"The principal trees of Tenasserim are the following, some of them classed by Dr. Wallich in his notice of the forests of these provinces:—

1. Anan.
2. Thengan, *Hopea odorata*.
3. Peengado, *Acacia*.
4. Bambwai.
5. Pumah, *Lagerstræmia*.
6. Kouk Kmoo.
7. Padouk, *Pterocarpus*.
8. Theet Kha.
9. Toung Baing.
10. Yin dick, "a bastard Ebony."

"The foregoing are the most generally known woods of the forests in common use with the natives, but to them might be added a list of forty or fifty others more or less useful, which require but a careful examination to reveal some quality that may render them of serviceable application. Of the remaining forest trees and shrubs which possess valuable properties, the following are those most adapted to a demand for European consumption; but owing to that absence of commercial enterprise already noticed, are at the present moment all excluded from the list of exports in Great Britain.

Dyes.

Sapan-wood........*Cæsalpinia Sapan*........Teni-yeit.
Jack-wood ....*Artocarpus integrifolia*....Pemgnay.
Red-dye ....*Morinda citrifolia* ....Neepatsay.

"Of trees and plants possessing odoriferous properties those forming articles of trade are as follows:—

Native Name.
Kurrawa........*Laurus Sassafras*......Sassafras.
Kenamet......*Santalum* ....Bastard Sandal-wood.
Thee-Kye-bo ..*Laurus C.* ....Wild Cinnamon,
Akyan........A very fragrant and a very scarce wood, of high value with the natives.

"The oil-producing trees are—
Ten-nyeng and Eing; both of the class Dipterocarpus, and
Theet-Tyee, producing the black varnish peculiar to the Burman territory, and of which the lacquered ware in general use is made.

"The Tavoy province, from the large number of wood oil-trees found in its forests, supplies the whole of the provinces with materials made from the oil, &c.

"The other known forest productions, which in quantities would form a valuable acquisition to the exports of these provinces, are,—

Gamboge, produce of Tha-nahtan, *Garcinia eliptica.*
Camphor, „ Blumea.
Balsam tolu.
Cardamoms.

"The trees producing both Gamboge and Balsom tolu, are unequally dispersed through the jungles, and are comparatively scarce; the gamboge predominates, and might afford a considerable quantity of the article, did the knowledge of its value and the process of collecting it exist with the Karens; the tree however is felled indiscriminately with the rest of the forest in the annual clearings for upland paddy, and vegetable plantations, and an article which forms a prominent item in the rich exports from Siam, is on this side of the border range utterly neglected and destroyed.

"The most common weed which springs up after the fires of the new clearings in the jungle, is that which produces the camphor; of its abundance it is scarcely necessary to remark, that it is, next to grass, in excess of all other spontaneous vegetable life, and with proper appliances in the manufacture of the salt (its property,) might be rendered useful as an article of commerce*."

The probable effects on the climate of Penang, of the continued destruction of the hill jungles of that island, are ably stated by J. S. Logan, Esq., in the same journal (vol. ii., p. 534, *et seq*). "It was remarked that the whole of the eastern front of the range (in Penang) has within a few years been denuded of its forest; the greater part of it is too steep for any permanent cultivation, and in all probability, after the fecundity of the fresh soil, enriched by the ashes of the trees has been exhausted, it will be abandoned by the Chinese squatters. It was not here alone that I was surprised to see the rapid progress which squatters and Chinese charcoal-burners have made in destroying the jungles in the hills during the last two years. In Singapore, the present zealous Governor (Col. Butterworth) has in an enlightened spirit, akin to that which has for some time characterized the Government of India in reference to the same subject, *absolutely prohibited* the further destruction of forests on the summits of hills. Representations have often been made to the local authorities at Penang, urging the necessity of reserving the jungles on the summits and higher slopes, but hitherto without effect. The reply has been, if the forests are of so much importance as the agriculturists insist, they must have a certain value to them, and they are at liberty to purchase any tract they choose. But it is impracticable for the holders of land to unite in making such a purchase; and were it at all practicable, the majority, from ignorance and selfishness, would refuse to contribute. But *Climate*

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* Mr. O'Riley, "Vegetable Productions of Tenasserim." Provin. Journ. Ind. Archipel. Feb. 1850.

concerns the whole community, and its prohibition from injury is one of the duties of Government. In Germany and France there are especial laws for the protection and extension of forests.* It is not necessary to cite Humboldt or Boussingault to prove the great influence in tropical regions of forests, and especially mountain forests, in attracting and condensing clouds, *diminishing local temperature* and *increasing humidity*. But if the forest had no other effect than to protect the *clay soil* of the mountains from the action of the sun's rays, this ought alone to be sufficient to secure their careful preservation. It is in this soil that the waters which supply all the streams of the island, and which percolate downwards to the lower lands, are enclosed. These mountains are, in fact, great natural reservoirs, elevated in mid-air, and exposing the most extended surfaces possible, which are covered to a small depth with a sponge of porous decomposed rock, for the absorption and retention of water. In ordinary seasons, when there is a considerable fall of rain, the importance of preventing the contents of these reservoirs from being dissipated may not be so obvious : but it may now be considered a well-established fact that the Eastern Archipelago is subject to periodical droughts, although the laws of their recurrence are not yet ascertained. That such droughts will again and again happen, and are in fact the settled course of nature, admits of no question.

" Nature, when left to herself, provides a compensatory influence in the dense leafy forests ; but if these are consigned to destruction, every successive drought will prove more baneful than the preceding. Unless Government will reserve at least the steeper mountain tracts, which are not adapted for permanent culture, there is nothing visionary in apprehension, for it has been realized in other localities, that in some prolonged droughts, after the naked sides of the hills have been exposed to the direct heat of the sun, every stream in the island will be dried up, and a universal aridity ensue. The great extent to which the mainland of Penang has been shorn of its forests, would of itself produce an urgent necessity for a stop being at once put to a war with nature, which must entail severe calamities for the future. In those mountains in Greece which have been deprived of their forests, the springs have disappeared. In other parts of the globe the same consequence has followed. The sultry atmosphere and dreadful droughts of the Cape de Verd Islands are owing to the destruction of the forests. *In large districts of India, climate and irrigation have rapidly deteriorated* from a similar cause, and the Government having become fully impressed with the necessity of respecting the stubborn facts of nature, every means have been used to avert and remedy the mischief. Forests which had been so easily and thoughtlessly cut down have at great cost been restored.

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* They have the same in all the Italian States, So far back as 1475 the subject attracted the attention of the famous Venetian Council of X., by which a law was passed on the 7th of January of that year, regulating in great detail the clearance of the forests on *terra firma*. The mountain forests especially were protected by judicious regulations, which were renewed from time to time down to the very year of the extinction of the old republics. Tuscany and the Pontifical governments were equally provident.—*Idraulica Ragionata di Mengotti*, p. 321, *et seq.*

We extract the following very interesting results of tree plantations, showing that they may be self-supporting, from an article in the *Calcutta Review* (No. 23), by Captain R. Baird Smith, Bengal Engineers :

"The formation of plantations early occupied the attention of the British Superintendents of the Western Jumna Canal. Something was done by Captains Blane and Tickell, but it was left to Colonel Colvin to proceed systematically in this useful duty. An allowance originally of 2,000 rupees, afterwards increased to 3,000 rupees per annum, was allotted to the plantations, and they have been spread over all parts of the canals to which water could reach. The trees planted are chiefly the Sissú, the Toon, the Kirkur, the Cirrus, the Saul, and the Teak, all furnishing wood of value for economical purposes. The revenue derived from the plantations, although not large, has more than covered all expenditure upon them ; and their ultimate value will be very considerable. The details of the kind, number, and estimated present value of the trees on the 30th April, 1847, are shown below : —

Kikur, (*Vachellia farnesiana,*)	91,520
Bambus (*Bambusa,* var. sp.)	4,420
Jamun (*Eugenia Jambos,*)	6,914
Kutchna (*Bauhenia,*)	1,771
Mangos (*Mangifera indica,*)	1,060
Mulberry (*Morus,* var. sp.)	18,746
Nim (*Melia Azaderach,*)	7,126
Cirrus (*Acavia Sissoo,*)	13,966
Sissoo (*Dalbergia Sissoo,*)	1,84,252
Toon (*Cedrela toona,*)	35,487
Sundry,	9,990
Total,	3,75,252

"The estimated value of these trees is 5,66,998-5-4 rupees, and the total expenditure by Government up to the present time amounts to only 27,363-5-7 rupees, or about one-fourth of the revenue derived from the plantations, as shown in the annexed statement :—

"*Statement of Revenue from Sale of Wood, Grass, &c., from the Plantations of the Western Jumna Canals :—*

	Rupees.		
1820-21	635	11	0
1821-22	1,180	9	4
1822-23	741	7	11
1823-24	656	0	10
1824-25	545	7	7
Carried over,	3,759	4	8

Brought forward,	3,759	4	8
1825-26	370	9	9
1826-27	713	13	11
1827-28	1,460	13	9
1828-29	1,289	8	8
1829-30	1,142	15	4
1830-31	1,265	4	8
1831-32	2,127	7	0
1832-33	2,651	2	11
1833-34	3,894	6	11
1834-35	3,682	2	10
1835-36	4,957	11	9
1836-37	2,245	6	0
1837-38	5,221	8	8
1838-39	6,171	4	2
1839-40	4,822	14	10
1840-41	5,481	6	0
1841-42	5,607	3	7
1842-43	6,756	12	2
1843-44	4,827	5	3
1844-45	5,149	11	1
1845-46	7,056	0	1
1846-47	10,167	10	4
Grand total,	90,822	8	4

"The plantations on the Eastern Jumna Canal were commenced simultaneously with the canal itself, and have been extended systematically from that period up to the present time. The kinds and numbers of the trees in the Canal plantations are shown below :—

Sissú	209,870
Cirrus	8,058
Kikur	28,501
Nim	6,799
Mulberry	9,305
Bambus	1,906
Lullow	2,774
Teak	1,158
Toon	15,967
Sundry	7,416
Total,	2,91,754

"The estimated value of the plantations is 1,46,793 rupees: and the total expense incurred by Government in their formation up to April, 1847, is 22,142-1-2 rupees, which sum, as will be seen by the following statement, has been nearly covered by the sale of wood, &c., from the banks.

"*Statement of Annual Revenue from Sale of Plantation Produce on the Eastern Jumna Canal:—*

	Rupees.		
1830-31	592	15	3
1831-32	606	6	2
1832-33	665	7	7½
1833-34	773	11	8
1834-35	815	15	5¼
1835-36	1,034	9	4
1836-37	1,168	5	2
1837-38	1,222	5	2
1838-39	1,073	9	1
1839-40	1,282	8	0
1840-41	2,470	0	5
1841-42	1,645	3	5
1842-43	1,940	7	6
1843-44	1,413	12	9
1844-45	1,704	1	11
1845-46	1,725	11	1
1846-47	1,844	0	11
Grand total,	21,977	2	10¾

"In addition to the plantations of forest-trees, grafted mango gardens have lately been established with the view of introducing a superior fruit into the country adjoining the canal. Of these gardens five are in existence, containing about 300 trees each, and being from three to five acres in extent: the result of their establishment has been very satisfactory; and although only one of the number has yet arrived at maturity, they have proved very successful, the demand for grafts and fruit being much in excess of the means of supply. The native community, for whom they were chiefly intended, have shown their appreciation of them by purchasing a large number of grafts, and there is every probability that the intention of Government in sanctioning the project will be fully realized."

The following observations, on the spread of tree-cultivation throughout the north-western provinces, are from the proceedings of the Agricultural and Horticultural Society of India, April 1841:—

"The Hon. the president (Sir Edward Ryan) called attention to a subject which engaged much the consideration of parties interested in furthering the agricultural welfare in the provinces of Upper India. He alluded to the great want which was felt for a sufficiency of timber-trees and firewood throughout the Azimghur, Jaunpore, part of the Benares, the Dooab, Rohilcund, and Delhi provinces, now that the manufacturing energies of the people were becoming aroused by the increasing demand that there was for sugar. This Society (he stated) had a gold medal placed at its disposal by Mr. Tucker, for presentation to any individual who might raise the largest plantation of trees in the Agra presidency, so impressed was this gentleman of the necessity of some steps being taken to promote so important a measure.

"In recommending more general attention to the subject of planting in India, it is perhaps unnecessary, after detailing the foregoing facts, to dwell longer on what appears to be the absolute necessity of something being done either by Government or by individuals for the preservation of old forests or the formation of new ones, whether this be immediately profitable or not, because so long a time is required to bring timber to perfection, that unless some means are adopted to provide for the future, so great a dearth of timber will be experienced as to put a stop to construction of all kinds, that is to almost every thing required for civilized life, or to force the Government and natives of India to import timber at any sacrifice, even when there are abundant tracts of unprofitable land, which might have been occupied by valuable timber, and which would have yielded yearly some returns long before the trees were fit to cut down. In India, not only would the thinnings and prunings of forests be required for all the purposes for which these are sold in Europe, but a constant demand and profitable sale must always give value to even the smallest fragment of wood in a country where it is the universal fuel for daily cooking the food of millions, as well as for imparting warmth in the cold-weather months, and required also for all the chemical arts in which heat is necessary, some of which, as the preparation of sugar and of indigo, are performed on the very farms where the plants are grown. The leaves also of many trees are employed as fodder for elephants, camels, and in the Himalayas even for goats, sheep and horned cattle. They are collected also when dry for fuel, and are preferred, I believe, for some fires, as those for heating ovens; but their more legitimate employment, of being allowed to enrich the soil becomes neglected."—*Royle, MSS. cit.*

"Another object I would particularly call attention to, is the felling of timber at the proper season when the sap is at rest. It requires no botanist to point out when this is to be done; although the leaves do not fall off in India, as in more temperate climates, it is impossible to find any difficulty in deciding, from the appearance of the tree, when the time for felling has arrived. When the sap is rising the leaves are generally somewhat soft and perfect; when it is at rest, the leaves are harder, and, in India, almost always corroded by insects. In consequence of the facility of barking a tree when the sap is rising, oaks are often felled at this season in England, always with disadvantage to the timber; and this same facility of barking is too often an inducement to the renters of forests in India to fell timber at improper periods of the year."—(Capt. Munro on the Timber Trees of Bengal, in Journal of Asiatic Society of Bengal, No. XI. new series, page 1.)

It is not only in affording indigenous woods of wonderful variety, serving all the purposes to which timber is applied, that the Indian forests claim our attentive consideration. In them Nature presents to us other sources of wealth, which under judicious management may yield a considerable increase to the present revenue. Gums, drugs, dyes, resins abound, as gutta-percha, caoutchouc, kino, gamboge, camphor, dammer, piney, varnish, wood-oil, with many other products not sufficiently known or appreciated, but which, as the light of European science penetrates these partially explored regions, will be applied to many useful purposes in the arts and sciences.

The *Isonandra gutta* flourished for centuries in its native jungles exuding its juice only to be received by the soil, before the discovery was made that gutta-percha was suited for such an infinite number of applications (the properties of the other species remain to be examined), and the geographical limits of the *Taban*-tree have yet to be ascertained. To urge the necessity of exercising careful vigilance in protecting the trees whence so valuable a product is derived, will perhaps appear unnecessary, but we know that even their admitted financial value has not been sufficient to protect them from thoughtless waste, but the contrary, as has been illustrated by various writers in the Journal of the Indian Archipelago.

The recent discovery of the source of East Indian kino, by Dr. Royle,* the researches of Dr. Christison as to the new varieties of gamboge, and the various investigations of Dr. Pereira, are instances of interesting and important advances in the medical botany of the Indian forests. The abundance of *Pterocarpus marsupium* over the continent of India, producing the kino, and the occurrence of *Garcinia pictoria* and *elliptica*, yielding the gamboge, both in Coorg and Burmah, lead to the conclusion that much remains to be done in developing the pharmaceutic resources of these forests.

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* Pharmaceutical Journal, May, 1846, p. 500.

We are assured by the Rev. Mr. Mason,* Mr. O'Riley,† and other observers, that the gamboge-trees (*Garcinia elliptica*) are dispersed through the forests of Burmah in such numbers as to afford a considerable quantity of the exudation, did the knowledge of its value, and the process of preparing it exist with the natives (Karcans). The tree, however, is felled indiscriminately with the rest of the forest in the annual clearings which take place, and the article, which forms a prominent item in the rich exports from Siam, is on the eastern side of the border range utterly neglected and destroyed.

"The districts where the Burmese gamboge is produced are nearly in the same latitude with Cambodia, where the commercial gamboge of Siam is known to be collected; the two localities are even at no great geographical distance from each other, and hence a strong presumption arises that the tree of Burmah is the same with the unknown gamboge-tree of Siam."‡

The Coorg or Wynaad gamboge-tree has an extensive range; we have seen it along all the higher parts of the Malabar Ghauts for fully 120 miles from North to South, and in some parts it is very abundant; yet the produce for the most part is made little use of, and the tree is considered of so small value, that we have seen the supports and scaffolding of bridges, &c., entirely composed of the stems of *Garcinia pictoria*, though from the valuable observations of Dr. Christison, this gamboge may be advantageously applied to any use to which the gamboge of Siam is habitually put. We are glad to learn that it is now becoming much used as a pigment§; and as the exudation may be obtained in large quantity, it may be introduced equally to European trade, when once the natives learn how to collect it in a state of purity, and make it up in homogeneous masses, in imitation of pipe gamboge, the finest Siam variety.

The names of the trees producing gamboge and kino should be added to the list of trees protected from indiscriminate destruction, which list, so far as we know, is at present limited to the Teak, Ebony, Black-wood and Sandal-wood.

* Journal of the Asiatic Society of Bengal.

† Journal of Indian Archipelago.

‡ Christian, in Pharmaceutical Journal for August, 1846.

§ In illustration of the variety of indigenous pigments, we may state that one of our number (Dr. Cleghorn), finding his colour-box becoming exhausted, was enabled to supply all his deficiencies, without difficulty, from the natural products of the surrounding forest, including yellow from *Garcinia pictoria*, blue from various species of *Indigofera*, red and purple from *Oldenlandia umbellata*, "Pupplay Chukkay" (*Ventilago?*) and *Vatica laccifera*.

Many other trees should no doubt be added to this list. In the present state of our knowledge, however, we shall not venture to refer to any except the oil-yielding trees, of which the commercial importance cannot be overrated, and to which comparatively little attention has yet been paid. In the limits of a report like the present, we can only indicate in a cursory manner the names of the more important and best known trees of this class. We may especially allude to the different species of Bassia, *Stillingia sebefera* (tallow-tree of China), *Vateria Indica,* which, from the high melting-point of their oils or fats, have a peculiar importance from their use in the manufacture of candles, and from their being capable of replacing animal fats for other purposes. Of those trees which yield fluid oils, *Calophyllum inophyllum, Aleurites triloba,* and *Pongamia glabra,* may be particularly mentioned (though various others possessed of equally valuable properties would probably be discovered by a more careful examination of those forests). The demand for oils in European commerce has been steadily on the increase for some years past, and the quantities consumed are now so large that these and the other oleaginous products of tropical climates must sooner or later acquire considerable commercial importance, and render the preservation of the plants which yield them deserving the attention of Government, not so much from their present importance, as from the value which they are likely soon to acquire.

We have alluded to gutta-percha; its brief but remarkable history was lately detailed in an overland journal. The history of *gutta-purcha* or *gutta-taban,* is brief but not uneventful. Previously to 1844 the very name of gutta-purcha was unknown to European commerce. In that year two cwts. of it were shipped experimentally from Singapore. The exportation of gutta-percha from that port rose in 1845 to 169 piculs (the picul is 133⅓ lbs.) in 1846 to 1364, in 1847 to 9296, in the first seven months of 1848 to 6,768 piculs. In the first four and half years of the trade 21,598 piculs of gutta-percha, valued at 274,190 dollars, were shipped at Singapore, the whole of which was sent to England, with the exception of 15 piculs to Mauritius, 470 to the Continent of Europe, and 922 to the United States.

But this rapid growth of the new trade conveys only a faint idea of the commotion it created among the native inhabitants of the Indian Archipelago. The jungles of Johore were the scene of the earliest gatherings, and they were soon ransacked in every direction by parties of Malays and Chinese, while the indigenous population gave themselves up to the search with unanimity and zeal. The Tamungong, with the usual policy of Oriental governors, declared the precious gum a government monopoly. He appropriated the greater part of the profits, and still left the Malays enough to stimulate them to pursue the quest, and to gain from 100 to 400 per cent. for themselves on what they procured from the aborigines. The Tamungong, not satisfied with buying at his own price all that was collected by private enterprise, sent out numerous parties of from 10 to 100 persons, and employed whole tribes of hereditary serfs in the quest of gutta-percha.

This organized body of gum-hunters spread itself like a cloud of locusts over the whole of Johore, peninsular and insular. They crossed the frontier into Linga, but there the Sultan was not long in discovering the new value that had been conferred upon his jungles. He confiscated the greater part of what had been collected by the interlopers, and in emulation of the Tamungong, declared *gutta-percha* or *gutta-taban* a royalty. The knowledge of the article, stirring the avidity of gatherers, gradually spread from Singapore northward as far as Penang, southward along the East coast of Sumatra, to Java, eastward to Borneo, where it was found at Brune, Sarawak and Potianak on the West coast, at Keti and Passir on the East. The imports of gutta-percha into Singapore from the 1st of January to the 12th of July 1848, according to their geographical distribution, were from the Malay peninsula 598 piculs, from the Johore Archipelago 1,269, from Sumatra 1,066, from Batavia 19, from Borneo 55. The price at Singapore was originally 8 dollars per picul; it rose to 24, and fell about the middle of 1848 to 13. In the course of 3½ years 270,000 taban-trees were felled in order to get at the gum, and nothing has been done to replace them.—*Express.*

We cannot help adverting in this place to the superb series of Indian timbers in the Exhibition, and also the very extensive collections of woods in the East India House; the former contain large contributions from the Northern Circars, Coimbatore, Assam, Arrakan and Malabar. The East Indian Museum contains a collection of 117 specimens sent by Dr. Roxburgh, 100 from Java by Dr. Horsfield, and 456 from Dr. Wallich, who gave the duplicates of his collection to the Society of Arts, of which they published a list in their Transactions, Vol. xlviii. p. 439, and for which they awarded the gold Isis medal. These sufficiently illustrate the great variety and great importance of the timber-trees of India, of which the following are the kinds chiefly used. Much useful information will be found in Holtzappfel's Descriptive Catalogue of Woods used in Turnery, to which notes have been added by Dr. Royle.[*]

Timber-Trees of India.

Botanical Names.	Natural Orders.
Tectona grandis, Teak,..	Verbenaceæ.
Gmelina arborea, ...	,,
Hemigymnia Macleodii, ...	,,
Vitex arborea, ...	,,
Premna hircina, ...	,,
———— flavescens, ...	,,

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[*] I have here to express regret that my approaching departure for India prevents me from giving so complete a list as I could wish, and entering at length upon details regarding the economic uses of some to which I paid considerable attention in India.

Botanical Names.	Natural Orders.
Cedrus Deodara,	Pinaceæ.
Cupressus torulosa,	”
Diospyros Melanoxylon,	Ebenaceæ.
Pterocarpus marsupium, Kino-tree,	Fabaceæ.
——— santalinus,	”
Dalbergia Sissoo,	”
——— latifolia, Blackwood,	”
Acacia arabica, Babool,	”
——— catechu,	”
——— speciosa,	”
——— sundra,	”
——— Serissa,	”
Vachellia farnesiana,	”
Vatica robusta,	Dipterocarpaceæ.
Calophyllum, Poon,	Garciniaceæ,
Heritiera minor,	Sterculiaceæ.
Tamarix.	Tamaricaceæ.
Rhododendron arboreum,	Ericaceæ.
Nauclea cordifolia,	Cinchonaceæ.
Hymenodictyon excelsum,	”
Buxus emarginatus, Box,	Euphorbiaceæ.
Grewia elastica,	Tiliaceæ.
Berrya ammonilla,	”
Quercus dilatata,	Quercaceæ.
Cedrela Toona,	Cedrelaceæ.
Chloroxylon Swietenia, Satin-wood,	”
Santalum album, Sandal-wood,	”
Swietenia Mahogani, Mahogany,	”
Soymida febrifuga,	”
Chickrussia tabularis,	”
Lagerströmia,	Lythraceæ.
Terminalia tomentosa,	Combretaceæ.
——— Belerica,	”
——— Catappa,	”
Conocarpus latifolia,	”
Artocarpus integrifolia, Jack,	Artocarpaceæ.

The general conclusions which appear to the Committee to be warranted, by the various statements of fact and opinion as given in their Report, are summed up as follows :—

1. That over large portions of the Indian Empire, there is at present an almost uncontrolled destruction of the indigenous forests in progress, from the careless habits of the native population.

2. That in Malabar, Tenasserim, and Scinde, where supervision is exercised, considerable improvement has already taken place.

3. That these improvements may be extended by a rigid enforcement of the present regulations and the enactment of additional provisions of the following character; viz., careful maintenance of the forests by the plantation of seedlings in place of mature trees removed, nurseries being established in the immediate neighbourhood,—prohibition of cutting until trees are well-grown, with rare and special exceptions for peculiar purposes. In cases of trees yielding gums, resins or other valuable products, that greater care be taken in tapping or notching the trees, most serious damage at present resulting from neglect in this operation.

4. That especial attention should be given to the preservation and maintenance of the forests occupying tracts unsuited for culture, whether by reason of altitude or peculiarities of physical structure.

5. That in a country to which the maintenance of its water supplies is of such extreme importance, the indiscriminate clearance of forests around the localities whence those supplies are derived is greatly to be deprecated.

6. That as much local ignorance prevails as to the number and nature of valuable forest products, measures should be taken to supply, through the officers in charge, information calculated to diminish such ignorance.

7. That as much information which may be of practical utility is contained in the Manuscript Reports and Proceedings of the late "Plantation Committee," it is desirable that the same should, if practicable, be abstracted and given to the public.

To show the sources whence the information has been derived, the Committee annex the following statement of authorities :—

I. On the general question of Indian Forests :—

Dr. Roxburgh : In Flora Indica, on properties of different Timber Trees of India.

Dr. Wallich : Reports connected with Natural Forests of the Empire, and Proceedings of Agri-Horticultural Society of India.

Dr. Royle : Productive Resources of India. *Passim.*

MS. Report on Plantations.

On the Sources of East India Kino. *Pharmaceutical Journ.* April, 1846.

Capt. Munro : Timber Trees of Bengal. *Journ. As. Soc. Beng.*

Dr. E. G. Balfour : Effects of Trees on Climate and Productiveness. *Madras Journ. Sc.*

II. Forests of Malabar and Canara.

Dr. Gibson : Various Reports on the above.

Dr. A. Turnbull Christie : *Jameson's New Philosophical Journal.*

Mr. J. Edye : Malabar Forests. *Journ. As. Soc.* II.

Capt. Threshie : On the Timber of Malabar, MS.

Dr. D. Macfarlane : Private Correspondence.

III. Travancore.

General Cullen : On the influence of Forests on Climate. **Madras Journ. Sc.*, 1850.

IV. Mysore.

Dr. Buchanan Hamilton : Journey through Mysore. 1801. *Passim.*

Dr. Christison : On Gamboge, a Vegetable product of the Mysore Forests *Pharm. Journ.*, Aug. 1846.

Capt. Onslow : Report on Forests of Nuggur, MS.

C. J. Smith, Esq. : On Effects of Trees on Climate. *Madras Journ. Sc.*, 1850.

Dr. H. Cleghorn : Hedge Plants of India. *Ann. Nat. Hist.*, 2nd series, vol vi. Also MSS.

V. Coimbatore and Neilgherries.

Dr. Wight : Private Correspondence and Neilgherry Plants.

VI. Tenasserim.

Dr. Wallich : Various MSS. very valuable.

Dr. Helfer : Reports on Tenasserim Provinces. *Journ. Asiat. Soc., Bengal.*

Mr. Bundell : Reports, MS.

Mr. Seppings : Reports, MS.

Mr. O'Riley : Vegetable Productions of Tenasserim Prov. *Journ. Indi. Archipel.*, Feb. 1850.

Col. Tremenheere : Reports on Teak Forests, MS.

VII. Penang and Singapore.

J. S. Logan, Esq. : Climatic Effects of Destruction of Forests in Penang. *Journ. Ind. Archipel.* Vol. ii. p. 534.

VIII. North-Western Provinces.

Dr. J. Forbes R[illegible]yle : Illustrations of Himalayan Botany.

Colonel Cautley : Report on Forests Dejrah Dhoon, MS.

Mr. Tucker : Proceedings of Agric. Soc. of India.

Captain Baird Smith : Agricultural Resources of the Punjaub. Canals of Irrigation in the N. W. Provinces (Plantations). *Calcut. Review*, No. ix

Captain R. Strachey : Journ. Asiat. Soc., Bengal.

Dr. Joseph D. Hooker : Notes of Excursion from Darjeeling to Sikkim in Journ. Asiat., Bengal.

APPENDIX.

In 1847 the Court of Directors sent a despatch to the Supreme Government, requesting the attention of the authorities to the effect of trees on the climate and productiveness of a country or district. On receiving this communication, the Madras Government directed a circular to their revenue officers, requesting them to forward any of the required information in their power, and several valuable reports were accordingly received in reply, some of which we annex as follows: —

General Cullen, Resident of Travancore:—"There cannot perhaps be a more beautiful illustration of the effect of mountain chains in arresting and condensing the vapour, than the generally luxuriant forests which clothe the eastern as well as the western ghauts, but which cease almost immediately on quitting those chains. The forests on the east coast as might be expected, are less lofty and luxuriant than those in Malabar, not only from the fall of rain on the east coast being only half that of Malabar, but also because they are in general double the distance from the sea, the chief source of all vapour.

"There can of course be little question as to the effect forests must have during a great part of the year, in preventing the dissipation of the superficial moisture, but I should doubt if that circumstance can have much influence on the supply of water from springs. The effect of the sun's rays on the earth, even when fully exposed to them, is sensible to but a very inconsiderable depth from the surface, and not at all so far as the subsidence of the water forming springs. The copiousness of springs must be influenced so much by a variety of other causes as to render the effect of forests hardly appreciable. The vicinity to elevated table-lands and mountains and hills, the nature of the rocks, and inclination of the strata, the general slope of the country, the absorbent qualities of the soil, &c., must all have the most important influence. At Trevandrum, even on eminences, the wells at a depth of forty feet from the surface rise occasionally several feet with a fall of rain of only the same number of inches, and within two or three days after heavy falls.

"In the forests of this coast, and above the ghauts in the western parts of Mysore, Wynaad and Coorg, the trees are, I believe, everywhere nearly destitute of leaves during the early part of the year, the driest and the hottest season; so that even in forest tracts the earth is at that period exposed to nearly the full force of the sun's rays.

"The long grass and low jungle are also generally burnt down in these months, and the general heat and dryness in passing through such tracts are frequently intolerable. The almost entire absence of moisture and springs in forest tracts in the dry season is well known.

"The district of Ernaad, in Malabar, formerly so celebrated for its teak forests, and still, I believe, with much forest of other kinds, is, I believe, for the most part a plain and nearly level, but in the hot season is like the other tracts I have noticed, equally destitute of vegetation and moisture, and I speak of these facts from having, although many years ago, passed over all the tracts in question."

Surgeon C. J. Smith, Bangalore :—"In the Mulnaad and Coorg the quantity of rain that falls is very great ; and to what can we attribute this, but to the influence of the ghauts and hilly country inland, covered with dense jungles, which attract and retain the largest portion of the South-West Monsoon ? Bellary, Seringapatam, and Octacamund are nearly in the same parallel of longitude, but at different distances from the line of ghauts, and to, this circumstance we may attribute the difference in the falls of rain at these stations."

Assistant-Surgeon Balfour, in his notes on this subject, has well remarked 'that the observations of scientific men support the belief that a mutual reaction goes on between these two physical agents, and that the presence of trees greatly adds to the supply of water and feeds the running streams. The instance of a single district losing its supply of water on being cleared of forest, and regaining it again when restored to its original state, would not alone establish more than strong presumption that the clearing of the forest and the loss of rain followed each other as cause and effect ; but the Honourable Court of Directors, in their circular, mention that this is not uncommon in America.

On the subject of springs, Assistant-Surgeon Balfour quotes from Jameson's *Edinburgh Philosophical Jonrnal*, a very remarkable instance at Popayan in Peru, of a district losing its supply of water from the clearance of the forest : —"Two instances corroborative of the above have come under my own observation, and happened to friends in different parts of the country engaged in coffee-planting. The first happened in a range of hills South-East of Bangalore, at a coffee plantation now called Glenmore, in the Debenaicottah talook of the Salem district. The proprietor, when preparing ground for a coffee garden, which was watered by an excellent spring, was warned by the natives not to clear away the trees in the immediate neighbourhood of his spring ; he disregarded their warning, cut down the trees, and lost his stream of water. The other instance happened at the village of Hoolhully, about eight miles distant from the head of the new ghaut in Mungerabad ; I wrote to the gentleman to whom it occurred, who answered as follows :—'The cutting down trees and clearing jungle on the sides of ravines, in the close vicinity of springs, undoubtedly has a great effect in diminishing the quantity of water. I found it so in one or two instances in ravines I had cleared for planting ; at one place where I had a nursery, which I used to water by turning a water-course from the spring, I found that since I cleared up the sides of the ravine in which the spring is (for planting), I have not anything like the quantity of water I had before the shade was cleared. I presume this is to be accounted for by the increased action of the air and sun; at any rate the natives about here are of that opinion. I leave the cause, however, to be settled by more scientific men than myself; that the effect is so, there is no doubt. A ravine close to the bungalo where there is a spring, a few years ago I cleared for planting, and found the water decrease in like manner; but the coffee-trees dying away, and the place being too small for a plantation, I did not renew them, but allowed the jungle to grow up again, since which the stream has nearly regained its former size.' "

The Superintendent of Nuggur writes, "that springs of water shaded by trees, almost invariably dry up on the trees being cleared away. This has been observed on the Neilgherry Hills and many other woody districts." In what way trees influence springs it is impossible to say; that they do so seems to be established, as also that they condense and attract vapour.

"This effect of trees in mitigating the intensity of tropical heat, has also been alluded to by the present superintendent of forests in our western presidency, who mentions that in the southern districts of Guzerat the vicinity of the sea and the proximity of the mountain tracts covered with jungle, tend to render the climate more mild, and the temperature throughout the year more equable than is the case in the other parts of the province. Further inland, and in the immediate vicinity of the hills, the heat is greater, and in both situations the humid and loaded atmosphere in the S. W. Monsoon is often painfully felt, particularly at night. In the whole of this district rain falls in greater quantities than to the northward; in the jungle districts to the east, the supply of rain is said never to fail in the driest of seasons, and it often falls there when none is apparent in the more open districts.

"It is in such tracts as these that rivers rise, for from the number, height, and comparative proximity of the hills to the southward of the Taptee, we might *à priori,* suppose that the supply of water in that district would be abundant: and such is actually the case, as we find in a breadth of fifty miles eight rivers, all containing water throughout the year. Reasoning from these facts, we may also predicate the sort of country in which these rivers have their origin, viz. underlying hilly tracts abounding in rich soil, highly retentive of moisture, and rendered still more so by luxuriant jungle."—*Surgeon Gibson in Tr. Bomb. Med. and Phys. Soc. Journ.*, pp. 37, 41.

Report from Dr. Gibson, dated 9th March, 1846.—"In the collectorate comprising the South Conkan, under Bombay, since this tract has been denuded of forest, as it now has been to a great extent from the pressure of population, all the inhabitants concur in asserting that the springs have left the uplands, that the climate has become greatly drier, the seasons more uncertain, and the land less fertile. I believe that this can be confirmed by the testimony of the late collector Mr. Elphinstone, but indeed it is most apparent to a person travelling along that line of country, as I have just now been doing, mainly with the intention of remarking changes which have taken place in the interval of fifteen years, which period of time has elapsed since I visited that line of country before; I have also understood that effects of a similar kind have been experienced at the Neilgherry Hills. A change of climate, similar to that now under contemplation, is by no means limited in extent to the mere district in which the clearing has taken place, but its influence extends far inland. Take for example all the Southern and Western portion of the Dharwar Zillah. This fertile country abounds in moisture, insomuch that it has been (though rather inaptly, I think) compared to the valley of the Mississippi; at all events American upland cotton grows there, which it will hardly do in other parts of the Bombay presidency. I think it is not too much to say, that much of this moisture depends on the wooded country forming its Western border, and that with the complete removal of this, the climate would greatly change. My own opinion is that in the Bombay presidency some cause of this kind has had a great share in producing that irregularity of the rainy season which has of late years been so much complained of, as to diminished fertility of the soil from the removal of belts of wooded country; the rationale of this is most evident."

(*From the Report of the British Association*) *for* 1851.

On the Occurrence of Palms and Bambus, with Pines and other Forms considered Northern, at considerable elevations in the Himalaya. By MAJOR MADDEN, H.E.I.C.S., F.R.S.E., M.R. *Dublin Society.**

Having resided for several years in the British portion of the Himalaya mountains, and more especially in the province of Kemaon, which borders on the Nepalese territories, I possessed opportunities for examining its botany, which up to that period had been investigated by native collectors only, and was thus enabled to determine the western extension of a number of plants, the existence of which had hitherto been supposed to be limited by Nepal. Among these were several palms, on the distribution and association of which, and the inferences to be drawn therefrom, I propose to lay before the Botanical Society, a few facts for its consideration.

1. The most common of these palms is one which Dr. Royle has designated *Phœnix humilis*, and which he supposes may be identical with *Ph. acaulis* of Roxburgh, and which is probably a mere variety of *Ph. sylvestris*, the wild date tree of India, useless for its fruit, but yielding abundance of sap, which, in Bengal, is largely employed in the manufacture of sugar. *Phœnix humilis* occurs in great abundance and beauty in the forest belt all along the

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* Read before the Botanical Society of Edinburgh, March 10, 1853. *Ann. & Mag. N. Hist.* Ser. 2. *Vol.* xi.

base of the mountains, up the warm valleys of the great rivers, and ascends the mountains to 5,500 feet, being plentiful at that elevation in the vicinity of Almorah, the capital of the province, and in one or two instances which came under my observation reaching even a thousand feet higher. In its dwarfed form, *Phœnix humilis* is found at least as far N. W. as the Sutluj river, and is the only one of the family which probably owing to the aridity of the climate, is to be met with in that region.* In several places in Kemaon (Dwarahat for instance) I noticed its arborescent state (*Phœnix sylvestris*), attaining the height of 40 to 50 feet at an elevation of 5,000 feet above the sea, surrounded at no great distance by extensive forests of *Pinus longifolia* and *Quercus incana*, the inferior limit of the former tree being about 2,000 feet above the sea-level.

2. *Harina* (*Wallichia*) *oblongifolia*, a very beautiful palm, first described by Mr. Griffith, and observed by him in Assam. This I found in abundance in the damp and very warm valleys of the Surjoo and Kalee rivers, near the Nepalese frontier at Burmdeo, and for many miles up the interior, but never ascending higher than 3,500 or 4,000 feet on the mountain sides, and only where the localities afforded abundance of shade and moisture. To the N. W. of the province it occurred in the Bumouree Pass, and in the valleys below the recently formed station of Nynee Tal; and still further west, it just reaches the Patlee Doon, a valley in the S. E. of Gurhwal, beyond which a careful examination failed to detect any trace of it. This palm, the leaves of which bear a great resemblance to those of *Corypha* or *Arenga*, and afford a very durable thatch, forms dense thickets, and never attains the arborescent form.

3. *Chamærops Khasyana* (Griffith), of which a plant raised from seeds sent home in 1847 is before the Meeting, was first met with and described by Mr. Griffith in the Khasya (or Cosseeah) Hills between the plains of Bengal and the Burhampootra river. As this eminent botanist remarks, it comes very near *Ch. Martiana* of Wallich, a native of Nepal, at 5,000 feet elevation; and further researches will, in my opinion, tend to the conclusion that they are, in fact, one and the same species.

Mr. Griffith's description as detailed in the Calcutta 'Journal of Natural History' is appended, with a few observations of my own to justify the opinion which I have formed of their identity.

As defined by this botanist, *Chámærops Khassyana* occurs in four localities of Kemaon, besides another (the Dhuj mountain), where I was informed on good native testimony of its presence in considerable quantities.

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* Advancing to the N. W. however, in the Khybur Pass, and generally in the low, arid, mountainous parts of Eastern Afghanistan and Beloochistan, in North latitude 26°–35°, we find abundance of *Chamærops Ritchiana*, Griffith, *Maizurrye* of the Afghans, a dwarf species seldom above 2-3 feet high, and if not identical with, closely allied to *Ch. humilis*, the only European palm flourishing in very nearly the same latitudes, and in a very similar climate.

Of these stations, the most remarkable for its elevation and the abundance and perfection of the palm is the Thakil mountain, named from it, an enormous mass of magnesian limestone reposing on clay-slate, in the eastern extremity of Kemaon, its loftiest summits attaining the elevation of 8,221 feet above Calcutta: the base of the mountain, as marked out by the deep gorges of the Surjoo and Kalee rivers, only 1,500 feet above the sea, and occupied by a tropical vegetation, cannot be under sixty miles in circuit. The zone of *Pinus longifolia*, which forms vast forests on its declivities, extends vertically from 2,000 to about 7,000 feet; the summits, for perhaps 400 feet, are denuded of all arboreous vegetation, and exhibit, as usual in the Himalaya, bare tracts of mere rock,* or meadows of luxuriant grass (*Rhaphis Royal*, *Arundinella hirsuta*, &c.), *Ophelia*, *Gentiana*, *Saxifraga*, *Primula*, &c. Below these come the zone where flourish luxuriant forests of *Quercus incana*, *lanata* and *floribunda*, *Acer*, *Ilex*, *Pavia*, *Rhododendron*, *Andromeda*, *Symplocos*, *Taxus*, *Berberis*, and other northern forms; amidst these, in damp shady glens on the North and South-East, but chiefly on the North-West exposure, the *Champærops* is found in great numbers, forming clumps and rows, the trees rising from 30 to 50 feet high, each with its superb crown of large flabelliform leaves, rattling loudly to the breeze. At 6 feet from the ground the stems are 2 feet in circumference, but become thicker above. The flowers appear in April and May, and the fruit, which is of a dark glossy blue, about half an inch long, ripens in October, and at the period of my visit (March 20, 1847,) lay strewed in abundance at the foot of the trees where large beds of snow remained unmelted, and where rich beds of *Primula denticulata* were in full bloom. The lowest specimens observed were at about 6,500 feet, but they reached their perfection in numbers and stature at 7,800, from which we may fairly infer, that had circumstances been favourable by the addition of some thousand feet to the altitude of the mountain, they would have ascended considerably higher. But in the site actually occupied by them, the mean annual temperature cannot be under that of London,† and though the summer be very warm, snow generally covers the ground from November till March. On the ascent of the mountain, *Phœnix* was abundant both in its dwarf and arboreous forms at 4,000 feet, while *Harina* forms extensive thickets in the river valley at its base.

The presence of *Chamærops* at such an elevation has its parallel in America, where, on the Andes of Quindiu and Tolima, in about 4° North latitude, Humboldt discovered *Ceroxylon Andicola* at from 5,800 to 9,500 feet, associated with a genus of Bambusidæ (*Chusquea*), which, as we shall presently observe, has more than one representative in the Himalaya also. He also informs us that on the western slope of Mexico, *Corypha dulcis* is mixed up in the forests of *Pinus occidentalis.*

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* A phænomenon, by the way, which illustrates the prophecy in Micah, iii. 12. "Therefore shall Zion for your sake be plowed as a field, and Jerusalem shall become heaps, and the mountain of the house as *the high places of the forest.*"

† *Ch. Martiana* has proved perfectly hardy at 19° Fahrenheit during the past winter. (*Gardeners' Chronicle*, April 9, 1853, p. 230.)

Chamærops Khasyana appears also to occur on Dhuj mountain, a few miles North-East of the Thakil; on the Kaleemooudee range between the rivers Ramgunga and Goree; and in the valley of the Surjoo near Bagesur. In the north-west of Kemaon I discovered dwarf specimens in two localities, viz. at the base of the Sutboonga mountain South-East of the Gagur Pass, in very dense forest at 6,500 feet elevation; and on the Berchoola, a spur of Bhutkot mountain, considerably further in the interior, and at about 8,000 feet elevation. In neither of these stations could I find any examples with stems beyond a foot or two high, and this circumstances as well as the fact that inquiry and investigation failed to detect any trace of their extension to the North-West, leads me to conclude that these points form the limit of the species in longitude. I must add, however, that in a paper addressed to Baron von Humboldt, the late Dr. W. Hoffmeister states that in the province of Gurhwal, on the descent from Dhunpoor to the Alacananda river (the main arm of the Ganges), he came upon a forest of *Pinus longifolia* at 6,800 feet; "and it is very remarkable that the *Chamærops Martiana* (Wallich) is here in immediate contact with it, some tall stems of that palm being even scattered in among the pines" (Travels in Ceylon and India, English Translation, p. 495). But in 1849 I went over this very ground, and on the most careful scrutiny no such trees were to be seen or heard of; and it is certain that in his letters written on or near the spot, as well as in the 'Synopsis of Vegetation' (pp. 307, 507) for this very route, no palm is mentioned except *Phœnix humilis,* which I myself also found to be common and occasionally arborescent; and such I doubt not is what Dr. Hoffmeister really intended. I had the pleasure of meeting him at Simla the same year (1845) that he made his journey, and being then engaged in some researches on the Coniferæ of the Himalaya, and having never then visited Kemaon and South-East Gurhwal, he very kindly furnished me with some brief memoranda on their occurrence in those districts; and here too I find *Phœnix humilis* alone mentioned in the locality specified. Hence I am justified in considering the stations on Bhutkot and Sutboonga in Kemaon, as the most westerly at which *Chamærops* has hitherto been observed.* A species of *Musa* (plantain or banana) is indigenous and abundant at a considerable elevation

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* A species of *Chamærops*, called Hemp Palm, has recently been discovered by Mr. Fortune in the Northern Provinces of China, Chekiang, and Kiangnan, where the winters are excessively cold. Plants sent to Kew in 1848 have "braved unharmed, and unprotected by any sort of covering, the severe winter now passed, 1849-1850" (Bot. Mag. March, 1850, quoted in Proceedings of Bot. Soc. May 13, 1852). If this be *Ch. Martiana*, it proves the great extension and hardiness of that species; if different, it affords an additional corroboration of the line of argument adopted in the text.

(7,000 feet) in the Eastern Himalaya North of Assam, and nearly to the same level in Sikkim : I have observed it only in one spot in Kemaon, the Bylchheena Pass, at about 4,000 feet elevation, and was told that it occurred much more abundantly at a short distance, in the valley of the Kaleê ; but as I had not time to verify the report, it need not be more than thus briefly alluded to.[*]

There is however one more genus of the Monocotyledones, and allied to the Palms, worthy of introduction here, from the very great elevation to which it reaches in the Himalaya, and from its affinity and resemblance to the tropical genus *Bambusa* ; I allude to the genus *Arundinaria* of the section Bambusidæ, of which at least four very distinct species occur in the Himalaya, and which have been referred to a new genus (*Thamnocalamus*) by my friend Dr. Falconer. They are familiarly known to European residents in the mountains as the "hill bamboo," and to the mountaineers of Gurhwal as the "Ringal," altered to "Ningala" in Kemaon. Of these, the lowest species in the vertical section is *Arundinaria falcata*, growing from 3,500 to 8,500 feet, and, like the rest, forming extensive and close thickets. The second is the *Arundinaria utilis* of Mr. Edgeworth, the Deo Ningala (or divine Ningala) of the natives, occurring from 7,000 to 9,000 feet. The third is variously named Geewasa, Purkha, Jhoomra, Surura (Jurboota in Nepal, where all these species are also found) ; I am not aware that this is yet described ; but its principal difference from the next is that the stems are solitary, not in clumps : it occurs from 7,000 to 10,000 feet. The fourth species is the Tham, in Nepal Khaptur, also undescribed, at least unpublished, which has its zone from 8,500 to 11,500 feet ; only 500 feet, or less, below the inferior limit of the perpetual ice of the glaciers, with the second and third species occupying nearly the entire zone of *all* the coniferous trees of the Himalaya, *Pinus longifolia* excepted, which is below them.[†] The most useful and remarkable of the four is *Arundinaria utilis*, which grows in fine clumps of many slender stems, from 20 to 40 feet high, extremely durable and applied to a great variety of purposes. The plant, like the true bambu, flowers but rarely, and the stems then die and fall. I was fortunate enough to collect considerable quantities of the seed near Pindree in 1846, which has, I believe, produced all the plants living in Great Britain and Ireland : three years afterwards, in a second visit to the alpine Himalaya, the stems which had fallen and died in that season were still perfectly sound, and I believe that the third and fourth species are nearly if not altogether as durable, but they never attain the stature of the Deo Ningala.

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[*] I am not aware of the exact locality in Nepal of the arborescent fern. *Alsophila gigantea*, but near Darjeeling in Sikkim, immediately to the east of that country, Dr. Hooker states that it flourishes between 4,000 and 7,000 feet above the sea ; 6,500 being there the upper limit of the palms ; a species of *Caryota* reaching up to 6,000, and *Calamus* as high, forty miles within the mountains ; while *Pothos, Musa, Ficus, Piper* have species from 2,000 to 7,000 feet, and *Ficus* one species to 9,500. But in the humid equable climates of the Southern hemisphere, Australia, New Zealand, Tasmania, the arborescent ferns reach a much higher parallel of latitude, and attain the height of 40 to 50 feet.

[†] "Bamboos in the general acceptation of the term (for remotely allied genera bear the same trivial English name) occur at all elevations below 12,000 feet, forming even in the pine woods, and above their zone, in the skirts of the Rhododendron scrub, a small, and sometimes almost impervious jungle." (Dr. J. D. Hooker, Excursion to Tonglo Mountain in Sikkim, Journal As. Soc. of Bengal, May, 1849, p. 424.)

The bearing of the foregoing facts on the phænomena of geology is so obvious as to require little comment ; the considerations most pressing on our attention being the necessity of great caution in drawing inferences as to the nature of climate from the presence of supposed tropical forms in ancient rock formations, and the facility with which we can now account for the juxtaposition of those forms with those of known temperate regions.

Here are palms, bambus, bananas growing amongst and above pines, firs, cedars, cypresses, yews, oaks,[*] maples, hazels, ash, and almost all the deciduous trees proper to a cold region of the globe. During violent storms and heavy rains it cannot but happen that some of these should be overthrown and buried beneath the huge landslips so prevalent at such crises, and there become fossilized to the perplexity of a succeeding race of geologists! Their difficulties and their errors might easily be enhanced and fortified by the addition of a very possible contingency in the animal kingdom, viz. the presence of the larger carnivora. The leopard is a constant and only too troublesome inhabitant of the Himalaya up at least to 9,000 feet, and commits great depredations on the flocks. The tiger, too numerous at the base, and in the hot valleys of the Kemaon and Gurhwal mountains, is, I think, merely an occasional, though by no means very, rare, visitor at that altitude in search of the larger deer; I have myself several times seen their footprints on the snow, with other marks of their having passed between 8,000 and 9,000 feet; at which elevation one friend of mine *met* a tiger in a thicket of Deo Ningala; and another who was on a shooting excursion fired at and wounded one up as high as 10,000 feet. Now, it is not at all impossible that one or more of these should perish in a storm, and be buried in the same deposit as the palms and conifers, &c., and thus render the problem greatly more complicated.

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[*] It must be remarked, however, that the oak, the pine, and other common Northern forms are even less justly adduced as the criteria of a cold climate than the palms are of a hot one. Our own *Quercus robur*, the Himalayan *Q. semecarpifolia*, with several Mexican and other species, flourish exclusively in low temperatures, but the great majority of the Indian species are natives of the moist warm regions of Nepal, Silhet, the Garrow and Khasya hills, Chittagong, Tenasserim, Martaban, Penang, &c. Such are sixteen out of the seventeen species enumerated by Roxburgh in the "Flora Indica." Professor Liebmann remarks (Oak-Vegetation of America, translated in Hooker's Journal of Botany and Kew Miscellany for 1852, p. 322) : It has hitherto been a prevailing notion that the oak-form is peculiarly characteristic of the temperate zone. But whether we look at the number of species, the beauty of the forms, or the size of particular organs (leaves, fruits, cups), we shall find their maximum in the tropical zone, that is, in the Sunda Islands of the Old World and tropical Mexico of the New." So also in the Himalaya, *Ulmus erosa* occurs at from 8,000 to 10,000 feet ; another species, erroneously as I think identified with the Chinese *Ulmus virgata*, between 6,000 and 7,000 feet ; a third in the hot valleys of Kemaon at 3,000 feet ; and a fourth *Ulmus integrifolia*, allied to the last, abounds at the base of the mountains, and all over the plains of India down to Coromandel and Guzerat. In the same warm plains we find *Ranunculus sceleratus*, as common and as luxuriant down the Ganges to Bengal as in Scotland : a *Clematis (C. Gouriana)* is so named from the old capital of Bengal where it was first discovered : a fine rose *(R. involucrata)* is wild in Behar at the foot of the Rajmahal hills : a blackberry *(Rubus distans*, Don*)* is found below the base of the Himalaya ; while *Potentilla supina* and *Heynii* abound along the Ganges to Calcutta. Of the Coniferæ, several genera and species are confined to high temperatures ; *e. g. Pinus longifolia* grows well at Calcutta, but perishes in our climate. *P. sinensis* flourishes on the coast of China, at Canton, and South of it. "One true pine is shown to be a native of Sumatra, *Pinus Merkusii*, Jungh. et De Vriese, Pl. Ind. Or. fasc. 1. tab. 1, probably the *P. Finlaysoniana* of Wallich, Cat. no. 6,062 from Cochin China" (Kew Miscellany and Journal of Botany for April 1851, p. 127). The genera *Dammara*, *Podocarpus*, *Dacrydium*, have their greatest number of species in Nepal, Khasya, Malacca, Java, Penang, and Amboyna ; even *Juniperus* has a species in Barbadoes *(J. Barbadensis*, *)*

So much for the mountains and the subtropical forms which flourish there; but the same result will be equally brought about in the hot plains of India by the transport of the northern plants through the agency of rivers and torrents.

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and another *(J. aquatica)* at Canton; while *Cupressus glauca* is a native of Goa; *C. sempervirens* is quite at home at Agra, with *Thuja orientalis*. The Coniferæ, in short, are as Dr. Lindley remarks (Vegetable Kingdom), "natives of various parts of the world, from the perpetual snows and inclement climate of Arctic America to the hottest regions of the Indian Archipelago."

On the other hand, several tropical genera besides those noted in the text have species at great altitudes in the mountains. Thus *Indigofera* has in the Himalaya *Indigofera pulchella* at 5,000 feet, *I. heterantha* at 7,000, and *I. Gerardiana (Dosua*, Don?*)* to 10,000; all large shrubs and forming extensive thickets. The beautiful *Acacia Julibrissin* ascends to 6,500 feet. Dr. Hooker remarks (Journal of As. Soc. Bengal for May, 1849, p. 426), that the general prevalence of bamboos, figs, and their allies the nettles, is a remarkable feature in the botany of the Sikkim Himalaya up nearly to 10,000 feet; "one species of this very tropical genus *(Ficus)* ascends almost to 9,000 feet, on the outer range of Sikkim;" as *F. laurifolia* does to 6,500 feet in the N. W. Himalaya. Gardner notices with surprise and admiration the prevalence of numerous species of this genus forming splendid trees in the forests of the Organ mountains, near Rio Janeiro. Of Laurineæ, *Cinnamomum* has one species in Sikkim to 8,500 feet, and *Tetranthera* another to 9,000 (Hooker, *l. c.*); while in the N. W. Himalaya, *Daphnidium*, *Litsæa*, &c., have species to the same elevation. In Sikkim, Dr. Hooker mentions *Balanophora* with species at 6,000, and one even to 8,000 feet; Dr. Thomson found it near Kotgurh, thirty miles North of Simla, between 6,000 and 7,000. Of the generally tropical family Cinchonaceæ, the true Cinchonas reach 10,000 feet or more in South America; just as in the Himalaya I found *Leptodermis lanceolata* at 10,000 feet on Dudutoli mountain in Gurhwal. But these anomalies are far too numerous for a note. I must add, however, that the physical conformation of the Himalaya of itself greatly favours the probability of tropical and temperate forms becoming associated by storms, torrents, &c.; for while the deep warm valleys which penetrate fifty or sixty miles towards the summit line are filled with a tropical or semitropical vegetation, the lofty ranges which divide them are clothed with forests of the temperate types.

The Khasya hills, where Griffith first met the *Chamærops*, rise like a wall from the flats of Bengal, and in many parts of the Himalaya the exterior range rises in precipices to the height of 6,000 to 8,000 feet, clothed to the brink with oak, ash, maple, pine, cypress, Siberian crab, &c.: immediately beneath is the vegetation of the tropics. The cliffs are wearing slowly back, and many of these oaks, &c. must be carried down by their own weight and by the torrents to form the most heterogeneous mass with Naucleas, Cinchonas, Vaticas, of the *Terai* Belt.

These reflections are forced on the mind at once in such localics as Nynee Tal Station in Kemaon.

But we may safely extend our view to the lower course and deltas of the three great rivers which ultimately drain the Himalaya, the Indus, the Ganges, and the Burhampootra. Mooltan and Sindh, on the first of these, are in many places covered with groves of *Phœnix dactylifera* and a forked palm, which, I suppose to be *Hyphæne Thebaica*, the Doom palm of Upper Egypt: Behar on the Ganges, in like manner, abounds in the fine palm *Borassus flabelliformis;* and in Bengal, *Phœnix sylvestris* and *paludosa, Areca Catechu,* and *Cocos nucifera,* often form great woods. Annually, during the floods, the great rivers bring down numbers of the Himalayan Coniferæ, which, were the country uninhabited, would be carried to the sea and deposited with the spoils of the deltas themselves in the new formations, which the mud and silt of these great rivers are known to be slowly depositing.* We should thus be presented with the association of palms and pines, the occurrence of which is so well ascertained in the coal-measures and far up into the tertiary series; and even though we were able to demonstrate that these trees were *in situ,* we have still the alternative to dispose of, that to the present day palms and pines actually flourish on the same ground, before we can legitimately argue from their juxtaposition any anomalous conditions of the atmosphere, differing greatly from our present experience. The existence of the mammoth in the cold regions of Northern Asia, provided with hair and fur to protect it from the severity of the climate, might, *à priori,* warrant a presumption of an analogous fact in the vegetable kingdom, namely the existence of palms, or other tropical families, so organized as to enable them to contend with a very low temperature.

This phænomenon now rests on actual observation, and is quite in accordance with facts in other branches of natural history, zoology, ornithology and conchology, where several familiar instances might be alleged of tropical genera with few, or even solitary species extending far into the arctic and antarctic zones, where their occurrence and discovery immediately and extensively modified, or even reversed, conclusions drawn from the presence in geological formations of cognate forms. And such uncertainty must continue to rest on the result of our researches, till, abandoning the maxim, absurd in science, that "the exception proves the rule," we cease to look too exclusively to genera, and allow to species their proper place and weight in our systems.

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* I can speak from observation as to the number of pines brought down by the Sutluj; and as long since as the age of Alexander the process must have been the same, for, the fleet with which he descended to the mouth of the Indus was constructed of them. There is a regular business in catching the floating trees, and not a very safe one; for such is the impetuosity of the rivers, that the men employed are sometimes drawn by the timber (to which they have fixed large hooks) into the current, and are infallibly lost.

Chamærops Martiana is described at length in the pages immediately preceding the above, and is said to occur at Bunipa in the valley of Nepal, at about 5,000 feet above the sea-level. As Mr. Griffith observes, the two palms are very closely allied: in my opinion they may still turn out to be identical. Among the supposed differences, that of "shorter stature" in *C. Khasyana* is quite unfounded: as I have already noticed, it occurs on Thakil mountains 50 feet high, whereas *C. Martiana* in only quoted at 20: the differences in the leaves may be accidental, for while Mr. Griffith states the laciniæ of *C. Martiana* to be "glaucous underneath," and omits any mention of it in his description of *C. Khasyana*, I found it equally true of the latter on the Gagur range. His description of the inflorescence and fruit is (note to page 340) chiefly from Martius in 'Pl. As. Rar.' iii. p. 5. t. 211, where, however, Mr. Griffith pronounces that "the representation of the inflorescence is probably quite wrong" (p. 341): and I suspect that the "yellowish," not "blue" fruit, may merely be due to the immature stage in which the former were observed; such at least is the case in others of this family: for instance, *Phœnix humilis*, before mentioned as common about Almorah, which exhibits various shades of yellow when unripe, but as it matures becomes of a dark blue. This plant Mr. Griffith was inclined to identify, very justly I believe, with *Phœnix acaulis*, from which to *Ph. sylvestris*, the common wild date tree of India, he observes (p. 352) that *Ph. dactylifera* and *farinifera* form complete transitions. I adopt Dr. Royle's specific name *humilis*, in preference to *acaulis*, as the shrub has frequently a stem several feet high, and may occasionally be observed in all gradations up to a tree of 50 feet. Young plants of the dwarf variety proper to Almorah are now flourishing at the Botanic Gardens, Edinburgh, and Glasnevin near Dublin. (*From the Annals and Magazine of Natural History, May*, 1853.)

Mode of treating Potatoes.

THOROUGHLY dried potatoes will always produce a crop free from disease. Such is the positive assertion of Mr. Bollman, one of the professors in the Russian Agricultural Institution at Gorigoretsky. In a very interesting pamphlet* by this gentleman, which has just reached us, it is asserted, as an unquestionable fact, that mere drying, if conducted at a sufficiently high temperature, and continued long enough, is a complete antidote to the disease.

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* Les Moyens de prévenir la Maladie des Pommes de Terre. Experiences et Conclus de A. N. C. Bollman, Conseiller d'ètat, Professeur, &c. 8vo. St. Petersburgh, 1853.

The account given by Professor Bollman of the accident which led to this discovery is as follows: He had contrived a potato-setter, which had the bad quality of destroying any sprouts that might be on the sets, and even of tearing away the rind. To harden the potatoes, so as to protect them against this accident, he resolved to dry them. In the spring of 1850, he placed a lot in a very hot room, and at the end of three weeks they were dry enough to plant. The potatoes came up well, and produced as good a crop as that of the neighbouring farmers, with this difference only, that they had no disease, and the crop was therefore, upon the whole, more abundant. Professor Bollman tells us that he regarded this as a mere accident; he, however, again dried his seed potatoes in 1851, and again his crop was abundant and free from disease, while everywhere on the surrounding land they were much affected. This was too remarkable a circumstance not to excite attention, and in 1852, a third trial took place. All Mr. Bollman's own stock of potatoes being exhausted, he was obliged to purchase his seed, which bore unmistakeable marks of having formed part of a crop that had been severely diseased; some, in fact, were quite rotten. After keeping them for about a month in a hot room, as before, he cut the largest potatoes into quarters, and the smaller into halves, and left them to dry for another week. Accidentally the drying was carried so far that apprehensions were entertained of a very bad crop, if any. Contrary to expectation, however, the sets pushed promptly, and grew so fast that excellent young potatoes were dug three weeks earlier than usual. Eventually nine times the quantity planted was produced, and, although the neighbouring fields were attacked, no trace of disease could be found on either the herbage or the potatoes themselves.

This singular result, obtained in three successive years, led to inquiry as to whether any similar cases were on record. In the course of the investigation two other facts were elicited. It was discovered that Mr. Losovsky (living in the government of Witebsk, in the district of Sebége), had for four years adopted the plan of drying the seed potatoes, and that during that time there had been no disease on his estate. It was again an accident which led to the practice of this gentleman. Five years ago, while his potatoes were digging, he put one in his pocket, and on returning home threw it on his stove *(doile)*, where it remained forgotten till the spring. Having then chanced to observe it, he had the curiosity to plant it, all dried up as it was, and obtained an abundant healthy crop; since that time the practice of drying has been continued, and always with great success. Professor Bollman remarks that it is usual in Russia, in many places, to smoke-dry flax, wheat, and rye, ; and in the west of Russia, experienced proprietors prefer for seed onions that have been kept over the winter in cottages without a chimney; such onions are called *dymka*, which may be interpreted smoke-dried

The second fact is this:—Mr. Wasileffsky, a gentleman residing in the government of Mohileff, is in the habit of keeping potatoes all the year round by storing them in the place where his hams are smoked. It happened, that in the spring of 1852, his seed potatoes, kept in the usual manner were insufficient; and he made up the requisite quantity with some of those which had been for a month in the smoking place. These potatoes produced a capital crop, very little diseased, while at the same time the crop from the sets which were not smoke-dried was extensively attacked by disease. Professor Bollman is of opinion that there would have been no disease at all, if the sets had been better dried.

The temperature required to produce the desired result is not very clearly made out. Mr. Bollman's room in which his first potatoes were dried was heated to about 72°, and much higher. By way of experiment he placed others in the chamber of the stove itself, where the thermometer stood at 136°, and more. He also ascertained that the vitality of the potato is not affected, even if the rind is charred. To this, however, and some other points, we shall return next week. In the meanwhile those who have the use of a malt kiln, or even a lime kiln, might even now try the effect of excessive drying, for a month seems to be long enough for the process; and if potatoes planted in the beginning of July will not yield much of a crop, it will at least be seen whether they are attacked by disease. (*From the Gardener's Chronicle, June 4th,* 1853.)

Monthly Proceedings of the Society.

(Saturday, the 15th January, 1853.)

Sir Arthur Buller, Vice-President, in the chair.

Election of Officers and Council for 1853.

The proceedings of the last Monthly General Meeting having been read, the Chairman intimated that this being the Anniversary Meeting, the election of Officers and Council for the current year would have to be taken into consideration, in accordance with sections 1, 2 and 3 of chapter x. of the Bye-Laws. The members present proceeded accordingly to the ballot; and Messrs. C. Gubbins, C.S., and S. Mornay, who were appointed scrutineers, reported the result to be as follows :—

President.—Sir Lawrence Peel.

Vice-Presidents.—Mr. W. G. Rose, Sir Arthur Buller, Baboo Ramgopal Ghose, and Rajah Pertab Chunder Sing.

Secretary and Treasurer.—Mr. A. H. Blechynden.

Council.—Mr. W. Storm, Mr. James Church, Senior, Mr. A. Grote, Baboo Peary Chand Mittra, Dr. H. Falconer, Mr. W. Haworth, Mr. W. H. Elliott, Mr. Geo. Taylor, Mr. C. A. Cantor, Mr. T. F. Henley, Mr. Francisco Pereira and Baboo Shib Chunder Deb.

Annual Report from the Council.

A summary of the principal objects which have engaged the attention of the Society during the past year was read. The Report states, among other topics, that the funds of the Society are in a satisfactory condition; that the receipts for 1852, exceed those of the previous year by Rs. 2,377; and that, after payment of the ordinary current expenditure for 1852, there remains the sum of Rs. 8,946, inclusive of a cash balance of Rs. 1208, to meet liabilities to the extent of Rs. 6,550. The vested fund is the same as at the close of 1851, namely Rs. 22,366. The accession of members during the past year has been 78, which is somewhat in excess of several previous years, except 1851, when an unusually large number (122) was added to the list. The number of *paying* members, exclusive of 37 who have compounded for their subscriptions, is now 515, or 20 in excess of 1851.

Proposed by Baboo Gobin Chunder Sein, seconded by Mr. Geo. Taylor, and *Resolved*, that the Report of the Council be adopted.

Standing Committees.

The revision of the various Standing Committees was next entered on. On the recommendation of the Council, the name of Mr. Edward Smith was added to the Cotton Committee, in the room of Mr. Earle, who is absent; of Mr. Wm. Stalkartt to the Hemp and Flax Committee, in the room of Captain Thompson, deceased; of Mr. T. F. Henley to the Coffee and Tobacco Committee, in the room of Colonel Sage, absent from Calcutta; of Mr. W. Haworth to the Committee for Implements of Husbandry and Machinery, also in the place of Colonel Sage; of Mr. Geo. Taylor to the Nursery Garden and Fruit and Kitchen Garden Committees, in the room of Mr. Earle; and of Mr. W. Haworth in the Oil and Grain Committees, which require strengthening. It being the opinion of the Meeting that the other Committees did not need strengthening, they remain as last year.

Elections.

Mr. W. H. Terraneau and the Rev. E. Higgs, who were proposed at the last General Meeting, were duly elected members.

Candidates for Election.

The names of the following gentlemen were submitted as desirous of joining the Society:

Lieut. Chas. Crawford Mason, 48th Regiment Madras N. I., and Adjutant Sebundy Local Corps, proposed by Captain W. G. Owen, seconded by the Secretary.

David Cuncliffe, Esq., Civil Service, Gya,—proposed by Mr. Grote, seconded by Dr. Falconer.

Baboo Bindabun Chunder Mittra,—proposed by Baboo Peary Chand Mittra, second by Baboo Shib Chunder Deb.

F. Frost, Esq., Commissariat Department, Meerut,—proposed by Mr. C. Macleod, seconded by the Secretary.

B. R. Landale. Esq., of Dheeree, Shahabad,—proposed by Dr. Begg, seconded by Mr. Walter Landale.

Defaulters to the Society.

The Chairman having submitted, on behalf of the Council, the names of five members who had failed to respond to the calls made on them for their subscriptions, it was resolved that the names of the four first be published as defaulters, in accordance with the provisions of section 7, of chapter iii., of the Bye-Laws, and the last, in accordance with section 1, of chapter iv. Their names are as follows:—

Baboo Tarrucknauth Roy, Principal Sudder Ameen of Maunbhoom, upwards of three years' subscription, Rs. 110.

Captain H. Kirke, 12th Regt. N. I., two and a half years' subscription. Rs. 80.

Lieut. John Ross, 71st Regt. N. I., upwards of two years' subscription, Rs. 72.

Mr. W. Patton, of Moulmein, ditto ditto.

Mr. C. T. Buckland, Civil Service, Rs. 56, due at the period of his resignation in 1850.

The Report of the Committee appointed at the last meeting to determine respecting the provision of vegetable and flower seeds for 1853, was read. The Committee suggest that supplies of vegetable seeds be procured, as last year, from North America and the Cape of Good Hope, and of flower seeds from England, at a cost not exceeding Rs. 7,100, exclusive of freight and other incidental charges. The Report which was recommended by the Council for adoption, was confirmed.

The joint Report of the Floricultural Committee, and Fruit and Kitchen Garden Committee, respecting the arrangements for the shows of the season, was also submitted. The Committees recommend that three shows be held in the Auckland Circus during the season, namely, on the 28th January, the 8th March, and 5th April,—the two latter being public holidays. The Report was adopted.

The submission of the Gardener's Monthly Report, and a few other communications and donations, was deferred to the next Monthly General Meeting.

(*Saturday, the 12th February,* 1853.)

The Hon'ble Sir Lawrence Peel, President, in the chair.

Elections.

Lieut. C. C. Mason, Baboo Bindabun Chunder Mittra, Messrs. David Cunliffe, C. S.; F. Frost, and B. R. Landale.

Candidates for Election.

Lieut. G. R. Wheeler, Interpreter and Quarter Master, 1st Regiment N. I.—proposed by Mr. R. Berkeley, seconded by the Secretary.

Major T. T. Pears, C. B., Madras Engineers,—proposed by Mr. Charles Gubbins, seconded by Dr. Falconer.

Lieut. F. S. Taylor, Bengal Engineers,—proposed by Colonel Huthwaite, C. B., seconded by Major J. R. Western.

J. T. D. Cameron, Esq., of La Martinière—proposed by Baboo Peary Chand Mittra, seconded by Mr. W. G. Rose.

Presentations.

1. Papers and Proceedings of the Royal Society of Van Dieman's Land (Vol. 2, part 1). *Presented by the Society.*

2. Journal of the Indian Archipelago for September and October, 1852. *Presented by the Editor.*

3. The same work for the same months. *Presented by the Government of Bengal.*

4. Journal of the Asiatic Society of Bengal, No, 6 of 1852. *Presented by the Society.*

5. Selections from the Records of the Bengal Government viz :—

No IX. Report on the Teak forests of the Tenasserim Provinces, by Dr. Falconer; and No. X. Report on the Establishment of Water works for the city of Calcutta, by F. W. Simms, Esq. *Presented by the Government of Bengal.*

6. A quantity of tea seed and of Deodar and other Himalayan coniferous seeds. *Presented by Dr. Jameson, Superintendent H. C. Botanic Gardens, N. W. P.*

7. A few bulbs from Port Natal. *Presented by L. Wray, Esq.*

8. A small collection of ornamental plants from the Royal Botanical Garden, Mauritius. *Presented by James Duncan, Esq., Superintendent of the Garden.*

9. A quantity of seed of *Myrica cerifera* from the Cape of Good Hope. *Presented by C. Gubbins. Esq.*

10. A supply of seed of *Sida rhomboidea,* a fine fibrous yielding plant. *Presented by Major S. F. Hannay.*

11. Further specimens of rattan plants from Arracan, and of raw and manufactured materials therefrom. *Presented by Lieut. F. W. Ripley.*

12. Samples of coffee and cotton raised in his garden at Deebroghur, Upper Assam, the latter from seed received from the Society. *Presented by Lieut.-Col. Jenkins, on behalf of Major Hannay.*

13. A specimen of moonga silk from Assam, produced by the *Saturnia Assamensis?* fed on the "Soom" tree, a species of *Tetranthera:* and a specimen of moonga and cotton wove together. *Presented by S. Mornay, Esq.*

14. Two pieces of cloth dyed with the "Room" dye of Assam. *Presented by Lieut.-Col. Jenkins.*

The following is extract of a letter from Col. Jenkins, respecting the above :—

"As the gentlemen who reported they could not make our Indigo (Room) take to the cloth, I have got the samples of Room dyed cloth for you from Major Hannay, and this I trust will satisfy you that there is no difficulty in using the dye. All the jackets of the Shans, Singphoos and others are dyed with this article, and the consumption of it in this way must be immense, as these dark-dyed stuffs are in universal wear. Your Calcutta chemists have failed as yet to find the proper mordaunt or solvent for the dye, or the proper mode of using it, but there can be no doubt of its being a most useful dye. What I had in view was the supposition that this dye might be found very useful, as the ground for a black dye, and perhaps you may be able to make some experiments with pieces of the accompanying cloths. I believe the dye is used in a raw state, as I have seen the Mikirs about here using the true Indigo."

The following plants and cut specimens were also placed on the table for the inspection of members :—

A plant of *Dendrobium nobile* in flower, and a fine branch of *Bugin-villæa spectabilis*, from the garden of Mr. James Church, Senior, at Agur-para.

Two dwarfed plants of *Euphorbia jacquiniflora* from the H. C. Botanic Garden; with the following memo. from Mr. R. Scott, the head-gardener :—

"Some two years ago at one of the shows of the Agricultural and Horticultural Society, I saw a plant of *Euphorbia jacquiniflora* with branches about seven feet long, and said to have been the growth of one season. The accompanying plants, shew what may be accomplished on the opposite direction, are ten months old from cuttings, and, as the appearance bespeaks, have been starved as long as could be done with safety to the plants, which have been allowed to "form" themselves; no stopping, pruning, or bending of the branches or twigs has been practised upon them."

Several well formed cut specimens of Ranunculus, raised from tubers received from Mr. Carter of Holborn in October last; of Narcissus, from George Taylor, Esq., and some fine cut specimens of roses of sorts, raised from plants presented by Mr. Booth, A. Emerson, Esq., and Mr. Dougherty of the Barrackpore Park : all the produce of the Society's Garden.

Notice of Motion.

Moved by the President, seconded by Mr. Rose—that the following two sections of the Bye-Laws, be altered as follows :—

Section 7 *of* Chapter iii, instead of the words :—"when any member shall be in arrear of his annual contribution for one year, he shall be apprised by letter," &c., the words, "when any member suall be in arrear of his annual contribution, or otherwise indebted to the Society for more than one year, he shall be apprised by letter," &c.

Section 1 *of* Chapter iv., after the words :—"of his arrears of subscription,"—the words—"or other debts to the Society"—to be introduced.

Horti-Floricultural Exhibitions.

Read the following reports of the Judges at the show of vegetables, fruits, and flowers, held in the Auckland Circus on the 28th January :—

Horticultural.—The Judges have the pleasure to report that though this show was not equal, as regards number of specimens exhibited, to the first show of last year, yet it may be considered a very fair one. The list of prizes annexed, gives in detail the amount awarded (Rs. 280) to 51 native gardeners. The competition was altogether spirited: upwards of 200 *mallees* were in attendance, and the produce brought by them occupied nearly two-thirds of the space allotted; viz. 1,500 feet, the other third or 750 feet being occupied by flowers.

In respect to *vegetables* it may be remarked that the potatoes were exceedingly well represented. There were three kinds, one of which had a very deep set eye with a rough skin, apparently the best adapted for keeping; the second, a large fine sort with a rough skin, and not so deep in the eye, was well grown, this seems to be the next best keeping kind; the third, a smooth skin and full eyed, appears to be an early sort, retaining its flavour only while growing. Carrots of four kinds were brought forward; viz. "early horn" in abundance, well-grown and well-flavored; the "Altringham" was better shewn this season than the last, and the flavor very good; the large white kind was long and well grown, but wanting in the pleasant flavor of the other two; the orange sort was also large and well raised, but better adapted for feeding cattle than for table use. The beet root was plentiful, and well grown. Turnips of four kinds were exhibited, the "white flat stone," "yellow table stone," "large white cow globe" and "Swedish": the two first-named sorts were large, solid and in excellent order for table use; the third was large but woolly, and the Swedish was rough and without shape or flavor. Nole kole of two kinds were shown in large quantity, but the greater part of them were overgrown and unfit for table use. The cauliflowers were large and well grown. Two kinds of Scotch kale were exhibited, the "green curled," and the variety commonly called the "cow kale"; both kinds were large-headed and well shown. Of brocoli, two sorts were likewise submitted, the "sulphur" and the "large early white;" both kinds were closeheaded, and large in size for this time of the year: a much larger display may be anticipated at the next show. Of cabbages no less than seven kinds were brought forward, namely," "sugar loaf," "savoy," "large york," "dwarf york" "battersea," "drumhead," and "red": the majority of these were as large and well shown as that of last year in the same month. The "battersea," "large, and dwarf yorks" in particular were exceedingly well grown.

The "green curled" and "broad leaved" endive were in abundance, well grown and tolerably well blanched. Two baskets only of spinach were brought forward, the "prickly" and "broad leaved" sorts; neither of them in good order. Of cabbage and coss lettuce there was an excellent display alike in quantity and quality. Of peas there were four distinct kinds all well grown and podded, more especially the "tall marrow," and "imperial blue." Three sorts of beans were brought forward: the "dwarft french," "long pod" and "windsor"; the two former were in abundance, and the pods well filled; of the "windsor bean" there was but a small quantity, and that of an indifferent character. The squash was larger and better grown than last year's specimens. There was a tolerably good display of pot herbs (sage, thyme, savory and marjoram.) Only one basket of water cress, but that in excellent order. Onions of two kinds were shown, one from seed, and the other from offsets, the whole abundant, and in good condition. Leeks of sowings of 1851-52 were likewise exhibited in capital order. Of celery the white kind was plentiful, tall and well blanched, but only fit for soups, a few heads only of the red sort were brought forward; these were small, and not well blanched; indeed, this vegetable has not kept pace with other foreign kinds at the hands of the native gardener. Of asparagus and artichoke, the display was very poor, but the present is not the season for either.

In the *fruit* department, a few orange plants in fruit, from China stock, were exhibited. Pomegranates, bêl, sapotas, pine apple and pumplenose were well represented, the two latter out of season. Custard apples and rose apples were likewise brought forward, though so early in the season. There were also some fair specimens of plantains, guavas and long plums.

Silver medals were dispensed with, as the *mallees* do not appear to appreciate them so well as money prizes.

(Signed) W. G. Rose.
„ G. Taylor.
„ Pearychand Mittra.

Floricultural.—The Judges have to report that the show was not equal to that of last year, nor was the competition so spirited, the produce of about 30 gardens only being represented, to 18 of which the prizes noted on the other side were awarded, amounting to Rs. 79. The plants most worthy of notice were the camellias, both red and white flowering sorts, of which some 20 plants, mostly in good condition, were submitted. Of the bulbous and orchid tribes there were very few specimens, it being too early in the season for them, and also for the majority of annuals. There were a few fine rose plants, good collections of pelargoniums of 12 sorts from the Auckland Garden, and of 15 sorts from the garden of Mr. H. Wood. The assortment of violets and heartsease was better than last year. A few well grown plants of German aster, in fine flower, were submitted; and a few good dahlias. Some fair examples of *Euphorbia jacquiniflora* and *Tropœlum peregrinum* were also exhibited.

The Judges conceive that the best acknowledgments of the Society are due to Major Burn, Town Major; to Major Bazely, Deputy-Principal-Commissary of Ordnance; and to Major Abercrombie, Officiating Garrison Engineer, for their obliging acquiescence in all the wishes of the Society, in the loan of tents and tables, and for the use of the ground in the Auckland Circus, on which the show was held. They would further desire to express their best thanks to Lieutenant-Colonel Spens and the other officers of the

2nd European Bengal Fusiliers, for granting the services of their fine band, which contributed so materially to the cheerfulness of the scene.

(Signed) H. FALCONER.
„ W. H. ELLIOT.
„ H. ALEXANDER.
„ A. GROTE.

A report from the Floricultural Committee on certain suggestions of Dr. Wallich respecting future supplies of seeds and plants for the Society, and on an interchange of plants and specimens with the Kew Garden and Museum was next read. *Resolved,* that the report be received and adopted, and that a copy thereof be forwarded for Dr. Wallich's information.

The Gardener's Monthly Reports for December, 1852, and January, 1853, were submitted. Mr. McMurray gives a final report on the consignment of flower seeds received from Mr. Carter in October last, shewing that the following sorts only, out of a large assortment, have failed; viz. *Cobæa scandens, Ipomopsis* of four kinds, *Loasa* of four sorts, *Blumenbachia insignis,* larkspur, 12 sorts, *Salvia patens, Tweedia cœrulea, Scypanthus elegans Viola odorata;* perennial phlox, *Berberis* of 4 species, and *Sollya heterophylla.* The Cape thatch-rush seed, which was presented by Mr. Sconce in July last, though sown under different modes, with great care, has not germinated. The mushroom spawn, presented by Mr. James Cowell, has not yet yielded fruit. Thirty out of 63 kinds of Australian seeds, purchased in July last, from Mr. T. P. Woodcock, have germinated to the present time. In the orchard many of the pummelo trees have flowered during December, and are now showing favourable signs of bearing a heavy crop of fruit. The large mango trees are also setting an abundance of flower buds, and one of the Arracan seedlings is now in flower. One of the three American apple trees, which was planted out in the open ground in July, 1850, flowered in December, and a small quantity of fruit, has now fairly set. The Gardener closes his report with a notice of presentations from Messrs. Emerson, Blyth, Booth, Manley, Burton, R. Wood, and F. Pereira; and adds in detail, a list of 260 plants received from the H. C. Botanic Garden.

Communications on various subjects.

The following letters were likewise submitted:—

1. From J. W. Dalrymple, Esq., Under-Secretary Government of Bengal, forwarding copy of a letter from the Secretary to the Board of Revenue, submitting the result of the Board's enquiries in regard to the different varieties of timber procurable for railway purposes in Bengal.

2. From A. R. Young, Esq., Under-Secretary to Government of India, forwarding copy of a communication from the Secretary to H. M.

Plenipotentiary and Superintendent of trade at Hong-Kong, on the subject of the native cotton wool of China.

(The above two communications were referred to the Committee of Papers.)

3. From Dr. James Allan, giving a brief notice of the second flower and vegetable show of the season held at Bhaugulpore on the 14th December. The following is extract of Dr. Allan's letter :—

"Our second flower and vegetable show took place on the 24th December. The flowers, with the exception of some beautiful cut narcissus, sprigs of *Chiococa racemosa* and *Salvia splendens*, and a few early annuals, made but a poor show. The vegetable display made up for it, as besides the usual show of cauliflowers, peas, &c., from acclimated seed, nolekole, red cabbage, drum head and sugar loaf cabbages, squash, carrot, Aberdeen and Swede turnips, beet, parsley, lettuces of two kinds, marrow-fat peas, and globe artichoke, the produce of American seed were exhibited, and all of first-rate quality. This early display speaks well for our climate and soil, and perhaps also I may add for the skill and care of the amateur gardeners of our community."

4. From the Rev. T. A. C. Ferminger, of Ferozepore, reporting on sowings of vegetable and flower seeds received last year from the Society :—"The Cape and American seeds I find almost unexceptionably good. The great portion of Mr. Carter's annual seeds are excellent; but there are some that always fail with me. Do you not think it would be a matter of great interest to the members at large, if the Society were to publish the names of such seeds as they fail of raising in their garden? We should then ascertain whether the fault were in the seed itself, or were referable to the climate where or the method by which we attempted to raise it. Those I cannot manage to raise are *Aquilegia, Blumenbachea, Browallia, Lophospermum, Martynia*, violets and a few others."

5. From L. Wray, Esq., dated from Port Natal, 10th Novr., 1852, applying for a collection of useful and ornamental plants for introduction into that colony, and promising to reciprocate. It was agreed, on the recommendation of the Council, that Mr. Wray's requests be complied with.

(*Saturday, the 12th March*, 1853.)

W. G. Rose, Esq., Vice-President, in the chair.

The proceedings of the last monthly meeting were read and confirmed, and the gentlemen who were proposed on that occasion, were duly elected members, viz:—Lieut. G. R. Wheeler, Major T. T. Pears, C. B.; Lieut. F. S. Taylor, and Mr. J. T. D. Cameron.

Brigadier Hon'ble T. Ashburnham, C. B., (H. M. 29th Regiment) Commanding at Ferozepore, was proposed as a Member by Lieut.-Col. Geo. Congreve, C. B., seconded by the Secretary.

The report of the special committee, consisting of Messrs. W. Haworth, (Chairman) John Thomson, John Ward, J. M. Vos, F. G. Siddons, and T. F. Henley, who were appointed to examine into the merits and capabilities of the cotton-cleaning machines sent in to compete for the Government prize of Rs. 5,000, and the Society's gold medal, was read; after which it was moved by Mr. W. H. Elliott, seconded by Baboo Peary Chand Mittra, and unanimously *resolved;* That in accordance with the recommendation of the Council, the report be received and adopted, and a copy thereof forwarded for the information of the Government of India, with specimens of the cotton and seed as turned out by the machines: further, that the best acknowledgements of the Society be given to the Chairman and other Members of the Special Committee for the great care and attention they have devoted to the subject of their enquiry.

Read a letter from Mr. W. Haworth, Chairman of the Special Committee, suggesting that the sum of Rs. 100 be granted to Mr. James Gilbert for the time and labor which he bestowed in superintending the cleaning of the above machines, putting them into proper working order, and arranging them in the most convenient manner for testing. *Resolved*—that the recommendation of the Special Committee be complied with.

Horti-Floricultural Exhibition.

Read the following reports of the Judges at the show of vegetables, fruits and flowers, held in the Auckland Circus, on the 8th of March:—

Horticultural.—The judges beg to submit a list of the prizes awarded to 54 gardeners, amounting to 237 Rupees, at the show of vegetables and fruits held in the Auckland Garden on the 8th March; and to offer a few remarks on the specimens brought forward for competition.

In regard to the *Brassica* tribe it may be observed, that cabbages of seven kinds were well represented, viz: sugar loaf, early dwarf, large York, Battersea, Savoy, red, and drumhead: - of brocoli, there were two sorts, the early white cauliflower and sulphur, but the samples were not equal to those of last show: only one kind of Scotch kale was placed on the stand, and that of an indifferent quality. The endive (curled and broad-leaved kinds) shewed well, being well blanched, and having large heads. The lettuce was also well grown—of 4 sorts,—brown Dutch, cabbage, common black coss and Paris coss. The celery was again behind-hand: two kinds were exhibited, red and white, raised from seeds and offsets of the previous year; though better than the specimens of the last show, they were very inferior to the standard of a good celery. The turnips were equally as good as those submitted at the January show; and the carrots were better, they were in fine order consisting of three kinds, viz: Altringham, early horn, and long red Surrey. The quality of the beetroot is annually improving; the long red and turnip-rooted sorts shew well. The potatoes were excellent; three kinds were submitted, one of them, apparently, a good keeping kind, with pink, deep sunk eyes, the other two the smooth and rough skin sorts, now common here. Peas of three kinds, (Prussian, imperial, and marrowfat,) were all good samples, though late in the season. The squash, asparagus and artichoke were all fairly grown ; but the two latter may possibly be better shown next month. Herbs of six kinds, leeks, tomato, parsley, water cress, turnip radish, and horseradish, were all well represented : the latter vegetable appears to be now becoming fairly established. The beans (Windsor and French) were both well grown.

The collection of indigenous vegetable comprised about 20 different sorts.

The fruit department was not so largely represented as the vegetable ; but some fair specimens were exhibited, especially among the pomegranates, sapotas, pineapples, strawberries, and loquats.

(Signed) WM. G. ROSE.
" G. T. FRED. SPEEDE.
" GEO. TAYLOR.
" PEARY CHAND MITTRA.

Floricultural.—The judges have to report, that though several well grown plants were brought forward, and a few novelties exhibited, this show was not equal to that held on the 6th March, 1852. Several orchids, in good bloom, were submitted, especially those from the gardens of Messrs. James Church and Francisco Pereira. There was a tolerably fair assortment of bulbous and tuberous plants, including hyacinths, *ixias, babianas, vallotas, sparaxis* and lilies of sorts. The German asters were well represented, as also the verbenas, in which were included a few, apparently, new varieties from Mrs. McLeod's garden. The collection of *antirrhinums, portulacas, phloxes,* pinks and heartsease was great, but with the exception of the latter, they were not deemed worthy of prize notice. A few good plants of *cyclamen,* in full flower, were brought forward for the first time, the produce of Mr. B. Warwick's garden, who likewise submitted several other well-grown plants. Mr. Emerson contributed a fine healthy specimen of *fuchsia* and another of *Azalea indica,* the latter quite a novelty, at the Society's shows. Mr. Pereira also sent a fine *azalea,* a new kind of *heliotrope,* and a cut specimen of *Streletzia reginæ.* There was a good assortment of *echium* and *centranthus ;* also a well grown plant of *Rhodostemma gardenoides,* the latter from the Auckland Garden.

The produce of about forty gardens was submitted, and prizes awarded to twenty, (as per annexed detailed list) to the amount of Rs. 118.

(Signed) H. FALCONER, M. D.
" A. GROTE.

It was agreed to hold the next exhibition, fixed for the 5th of April, in the Town Hall.

Read a Report from the Translation Committee, submitting an impression of 500 copies of the 'Indian Agricultural Miscellany,' No. 1. of Vol. 1., together with a list of those persons through whom they suggest it should be distributed. The report and list, as recommended by the Council, were received and adopted.

The Gardener's Monthly Report was submitted. Mr. McMurray intimates that the American Sumac trees, *Cæsalpinia coriaria*, have yielded a heavy crop of seed, this season, which will be ready for distribution in April. The plants of *Nymphæa cærulea* have also flowered and seeded freely, and a small quantity of the seed, and likewise seed of the 'Jubbulpore' hemp, *Crotalaria tenuifolia*, can be given to such Members as may be desirous of growing either one or the other. The Gardener further reports that there are still a few maunds of arrow root tubers remaining on hand. He adds a list of the plants and seeds contributed to the garden since his last report by Messrs. G. Bartlett, B. Warwick, J. Church, and C. Gubbins.

In connection with the above report, the Secretary intimated that he had lately received from the Gardener about four and a half maunds of arrowroot powder prepared at the garden. Agreed that it be distributed freely to all members on application.

The motion of which notice was given by the President at the last meeting respecting certain alterations in two sections of the Bye-Laws was brought forward, but it could not be entertained in consequence of the number of members present being less than is required for such purpose.

Notice of Motion.

Proposed by Mr. W. G. Rose, and seconded by Mr. W. H. Elliott.

"That Mr. A. H. Blechynden, Secretary of the Society, be authorized to draw a personal allowance of Co.'s Rs. 100 per mensem (in addition to his present salary of Co.'s Rs. 400) from the commencement of the present year, in consideration of his long and faithful services, and the zeal, industry, and ability, with which he has always conducted its increasing duties."

A recommendation was submitted from the Council, for consideration at the next general meeting, in accordance with Section 5 of Ch. X. of the Bye-Laws, to the effect that Mr. Charles Huffnagle be elected a member of the Council in the room of Mr. James Church, absent from India.

Read a letter from Messrs. Purrier and Co., Agents General Screw Steam Shipping Company, intimating their readiness to forward to the Directors of their Company, with a recommendation for its compliance, the application of the Society to be allowed freight, free of charge, for seeds, to the extent of one ton annually.

Mr. Francisco Pereira submitted for the inspection of members two plants of *Azalea* in blossom, "*Azalea Smithii coccinea*," and "*A. prostrans* ;" and an orchid, name unknown, lately imported by him from Java.

(Saturday, the 9th April, 1853.*)*

W. G. Rose, Esq., Vice-President, in the chair.

The proceedings of the last general meeting having been read, an objection was raised to the confirmation of that portion which referred to a vacancy in the Council, and the recommendation of the Council thereon ; on the ground that it was contrary to the Bye-Laws ; but the Chairman being of opinion that, under Chapter II., and Section 8 of Chapter X., an honorary member is not disqualified for election into the Council, and that he is qualified under Section 3 of Chapter VI., the proceedings were confirmed *in toto.*

Brigadier Hon'ble T. Ashburnham, C. B, (H. M. 29th Regiment), Commanding at Ferozepore, was elected a Member of the Society.

Candidates for election.

Colonel John Barstow, Commanding 57th N. I., at Meean Meer ; R. Montgomery, Esq., Commissioner for the Punjaub ; and Capt. W. H. Delamain, Artillery, Sealkote,—proposed by Capt. F. C. Burnett, Horse Artillery, seconded by the Secretary.

Baboo Kisto Gopal Ghose, Zemindar, Moorshedabad,—proposed by Rajah Pertaub Chunder Sing, seconded by Baboo Peary Chand Mittra.

Baboo Kissen Kishore Ghose, pleader Sudder Court ; Baboo Sumbonauth Pundit, pleader Sudder Court ; Baboo Juggodur Nunden Mookerjee, pleader Sudder Court,—proposed by Baboo Peary Chand Mittra, seconded by Baboo Ram Gopal Ghose.

Presentations.

The following contributions were announced :—

1. Second Report of the Commissioners for the Exhibition of 1851 (2 copies.) *Presented by A. Grote, Esq.*

2. Selections from the Records of the Government of India, No 1. Papers on the Proposed Railway in Bengal. *Presented by the Government of India.*

3. Journal of the Asiatic Society of Bengal, No. 7 of 1852. *Presented by the Society.*

4. Journal of the Indian Archipelago for November, 1852. *Presented by the Editor.*

5. Musters of Chinese Cotton Wool. *Presented by the Government of India.*

6. Four bottles of a red wine manufactured from the common wild grape of Assam called "punialas." *Presented by Capt. E. T. Dalton, on behalf of Capt. E. Fleetwood Smith, Commanding at Saikwah.*

Capt. Dalton writes—"Capt. Smith has not favored me with any particulars regarding the preparation of this beverage. He says it is his first essay in wine making. He only wishes to bring the grapes to notice, as he thinks a good wine might be made from it, and, at the proper season, the grape is to be had in abundance in all parts of Upper Assam."

7. Specimens of the pith of the "dalbattee" grass *(Panicum interruptum ?) Presented by Baboo Peary Chand Mittra.*

The following is extract of Baboo Peary Chand Mittra's letter :—

"This grass grows in the bheels, jheels, &c., of Rungpore and Rajshye. Very little care is required to grow it. It is of a greenish color like 'kulmi,' about 8 feet long, and is used as a fodder for elephants. It has knots like reeds. These knots are cut, and the pith is forced out. It is then a little moist; but as soon as it is dried, it answers the purpose of lamp wicks admirably. It consumes perhaps a little more oil than cotton wicks, but it burns so well that it is hardly necessary to snuff it."

8. A few quince and poplar cuttings. *Presented by the Delhi Branch Society.*

These have arrived in good condition.

9. A quantity of American sumach seed *(Cæsalpinia coriaria)* and 5½ maunds of pea seed of sorts, the produce of the Society's Garden.

The motion, of which notice was given by the President at the February meeting, respecting certain alterations in two sections of the Bye-Laws, and which could not be entertained at the last meeting, in consequence of the number of members then present being less than is required for such purpose, was again brought forward, and on the motion of Dr. Falconer, seconded by Mr. Grote, was put to the vote, and carried unanimously.

The alterations are as follows :—

Section 7 of Chapter III. Instead of the words "when any member shall be in arrear of his annual contribution for one year, he shall be apprised by letter,"—the words—"when any member shall be in arrear of his annual contribution or otherwise indebted to the Society, for more than one year, he shall be apprised by letter, &c."

Section 1 *of Chapter* VI. After the words "if his arrears of subscription," the words "or other debts to the Society," to be introduced.

The motion, of which notice was given at the last meeting by Mr. W. G. Rose, seconded by Mr. W. H. Elliott, was next brought forward, when it was proposed by Mr. Elliott, seconded by Mr. Grote, and resolved, "that the motion by Mr. Rose, relative to the increase of Mr. Blechynden's allowances be referred to the Council for its opinion and report."

The recommendation, which was submitted to the last meeting relative to a vacancy in the Council, was also brought forward, and on the motion of Mr.

Elliott, seconded by Mr. Grote, was referred back to the Council for further consideration, on the ground of irregularity.

Horti-Floricultural Exhibition.

Read the following remarks of the Judges respecting the show of the 5th April :—

Horticultural.—The Judges beg to submit a list of prizes, amounting to Rs. 147, which were awarded at the third exhibition of vegetables and fruits held in the Town Hall, on the 5th of April, 1853, and to offer the following remarks :

In regard to *European vegetables,* it may be observed that the asparagus was tolerably well represented, and of fair quality. The artichokes were abundant and well headed. The cabbages, of 5 kinds, were well grown, viz., Dwarf York, Battersea, red, Savoy, and drumhead. One nice head of curled kale was shown, and a few of an inferior sort. Leeks were in abundance, large and well blanched. Onions also were well shown. Lettuces of two kinds in good order, but only one of endive. The early horn, Altringham, long, red and black carrots were plentiful, large and fine, more especially the two first-mentioned sorts. Of potatoes there was a fair display of good kinds. The long red and turnip-rooted beet root were both good and in abundance. The white and yellow stone turnips were likewise well shown, considering the lateness of the season ; the same remark is applicable to the turnip and long radishes. The brown-leaved and prickly spinage were green and fine. Of peas there was a small collection only. Specimens of celery were submitted both from seeds and offsets ; but they were not better than those brought forward at the last show. The horse-radish was perhaps better shown this time than at any previous exhibition. There was likewise a fair assortment of herbs of seven or eight kinds.

Among the *native vegetables,* there was a fair collection of beans, yams, brinjalls, cucumbers, ginger, maize, &c., &c.

In the department of *fruits,* the loquats and sapotas were best represented, both being large and well flavored. The pomegranates were few in number, but of excellent quality, and so were the bale. Of pine-apples and pummaloes the quantity and quality were indifferent. A few *ripe* peaches were submitted, though so early in the season. Some baskets of strawberries were also placed on the table. A few apples from Mr. Moran's garden in Tirhoot were brought to notice, apparently of three kinds,—the brown russet, pippin and golden pippin. Two kinds of China oranges were shewn. Of melons, plantains, guavas, papeeas, &c., &c, there was a fair display.

The competition was spirited, and the show may be pronounced to be an exceedingly good one altogether, more especially for the advanced season of the year.

(Signed) Wm. G. Ross.
" Geo. Taylor.
" G[illegible]. Fred. Speede.

Floricultural.—The produce of about 24 gardens was submitted on this occasion, and prizes amounting to Rs. 57 were awarded to twelve. A few tolerably well grown specimens of Orchids were exhibited, including *Dendrobium transpürens, D paxtoni, D farmerii, D pierardii, D secundum,* and *D desiflorum; Cymbidium aloifolium; Saccolabium guttatum; Vanda Roxburghii; Ærides odorata; Aporum cuspidatum; Epidendrum crassifolium;* from the gardens of Messrs. F. Pereira, J. Church, H. Swinhoe, B. Wärwick, C. McLeod, and the Rajah Pertaub Chunder Sing. A few good specimens of Gloxinias and Gesneras were shown, and a Siningia guttata. The assortment of German asters was fair. Only one specimen of fuchsia was submitted. There were a few fine examples of gladioli and amaryllids; also some plants of *Cineraria, Rhodostemma gardenoides,* and several well grown kinds of verbenas.

Altogether the show was limited, as might be expected at the present season.

(Signed) H. Falconer.
„ A. Grote.

The Gardener's Monthly Report was submitted. Mr. McMurray forwards a tabular statement of the pea crop for 1852-53, from which it would appear that the average percentage of this season's produce is more favourable than that of last year, by upwards of 18 per cent.; and by drawing a comparison between the produce obtained from the Cape and American seeds, sown during the last three years, it is evident the Cape seed has invariably been the most productive. The Gardener reports that the vanilla plants, both *V aromatica,* received from Mr. R. W. Frith, and *V planifolia,* received from the H. C. Botanic Garden, are flowering freely. The Shanghae peach trees, presented by Mr. Emerson, as also those received in the early part of 1850 in the ice-ship from Boston, are in blossom. The seed of *Myrica cerifera,* contributed by Mr. C. Gubbins, has germinated freely. Mr. McMurray details various contributions to the garden during the past month, including 18 kinds of *Pelargoniums,* and 6 sorts of *Oxalis* from Mr. L. Manly, and 6 shrubby peony plants from Mr. Francisco Pereira.

Read a letter from Mr. Alfred H. Cheek, Civil Surgeon of Cawnpore, dated 28th February, respecting the juice of an Euphorbiaceous plant;—

In connection with the above, the Secretary read extract of a note from Dr. Falconer, dated 8th April, forwarding the above letter and specimen of the material referred to by Mr. Cheek.

Resolved.—That the best acknowledgements of the Society be given to Mr. Cheek for his interesting communication, and that he be requested to furnish further particulars regarding this substance, with specimen of the plant yielding it.

Read a letter from Mr. T. F. Henley, dated 10th March, on the subject of the "green vegetable dye of the Chinese."

Read a communication from the Under-Secretary Government of Bengal, forwarding copy of a letter from the Under-Secretary Government of India, enclosing copy of a letter from Mr. Fortune, reporting his arrival in China, and his readiness to receive and act on any instructions from the Government of India in connection with the objects of his mission.

Submitted the following recommendation from the Council, in reference to the above two communications.

That the Government of India be solicited to obtain for the Society, through Mr. Fortune, as large a supply as procurable, of grafts of the best sorts of Chinese fruit trees, such as lychee, loquat, whampee, peach (more especially the large round peach of Shanghae) *Myrica sapida*, &c., &c., and any good descriptions of agricultural and horticultural seeds, such as might be acclimatised in Bengal. Further, that Mr. Fortune's attention be directed to the leguminous plant of the *Cæsalpinia* tribe yielding a kind of vegetable soap or cosmetic, of which specimens were sent to the Society, by Dr. Macgowan, in 1850; and that he be requested to procure seeds of the same, as also of the Chinese varnish tree, and of the trees on which the insect yielding the pela or white wax feeds; and seeds of such other plants, useful and ornamental, as are likely to answer in Bengal. That a copy of Mr. Henley's letter be forwarded through the Government to Mr. Fortune; and lastly, that the Society intimate their readiness to defray the cost attendant on carrying out the above requests.

Resolved—That the recommendation of the Council be adopted.

Communications on various subjects.

Read the following letters:

1. From Dr. Falconer, Superintendent H. C. Botanic Garden, dated 7th April, forwarding, by desire of the Hon'ble Lieutenant-Governor, Agra, copy of a letter to his address from the Secretary to Government N. W. P. with its enclosure, communicating the results of the trials of the North American fruit trees imported by Mr. Ladd, on board the *Epaminondas*, early in 1850, at the hill station at Mussooree. Dr. Falconer observes that "detailed particulars regarding the manner in which the plants were packed when put on board the ship are contained in the correspondence printed in Part 2, of Vol. VII. of the *Society's Journal*, (p. 172). The plants were not put up in Ward's (glazed) cases, but simply in closed deal boxes stowed among the ice blocks in the hold. The results upon the whole are satisfactory. Dr. Jameson's letter enumerates twenty varieties of fruit trees imported by the *Epaminondas*, which appear to have been fully established at Mussoorie. With reference to the concluding part of Mr. Muir's letter it is to be regretted that Mr. Ladd has not repeated the [illegible]ited and interesting venture, which succeeded so well in the case of the *Epaminondas*."

2. From E. Thomas, Esq., officiating Under-Secretary Government of India, forwarding further notices (with specimens) respecting the Cotton Wool of China.

3. From the Secretary Board of Revenue, Lower Provinces, forwarding a copy of Dr. Falconer's remarks on the best mode of tapping the Caoutchouc tree of Assam.

The above three communications were referred to the Committee of Papers.

4. From Dr. Mouat, Secretary Council of Education, acknowledging receipt of sixty copies of the Indian Agricultural Miscellany, and enclosing list of the schools to which they have been sent.

Submitted an application from the Head Gardener, together with an estimate of Rs. 229, for thoroughly repairing his dwelling-house and the out offices attached thereto.

Resolved that the estimate be adopted as recommended by the Council.

(Saturday, the 14th May, 1853.)

W. G. Rose, Esq., Vice-President, in the chair.

The proceedings of the last General Meeting were read and confirmed.

Elections.

Colonel John Barstow; R. Montgomery, Esq., C. S.; Captain W. H. Delamain, Artillery; Baboos Kisto Gopal Ghose; Kissen Kishore Ghose; Sumbonauth Pundit; and Juggodhur Nunden Mookerjee.

Proposals.

Baboo Rammonee Mohun Chowdry, Zemindar, Rungpore,—proposed by Baboo Peary Chand Mittra, seconded by Rajah Pertab Chunder Sing, Bahadoor.

J. A. Mangles, Esq., Civil Service, Chittagong,—proposed by Mr. A. Grote, seconded by Dr. Falconer.

Lieut. H. P. Bishop, Artillery, Dacca,—proposed by Mr. H. T. Raikes, seconded by the Secretary.

Lord William Hay, Civil Service, Simla,—proposed by Mr. James Hume, seconded by Dr. Huffnagle.

Joseph Shillingford, Esq., Indigo Planter, Purneah,—proposed by Mr. A. E. Russell, C. S., seconded by Mr. Eneas Mackintosh.

Presentations.

The following contributions were announced:

1. Journal of th[illegible]oyal Asiatic Society of Great Britain and Ireland, Part 2, Vol. XIII. *Presented by the Society.*

2. Transactions of the Society of Arts, Vol. 55, and Supplemental Vol., Parts 1 and 2, for 1846-47, 1847-48; also its Journal, No. 1 to 13. *Presented by the Society.*

3. Lectures on the Results of the Great Exhibition, first and second series. *Presented by the Society of Arts.*

4. Journal of the Indian Archipelago, for December, 1852. *Presented by the Editor.*

5. A copy of the above. *Presented by the Government of Bengal.*

6. Journal of the Asiatic Society of Bengal, No. 1 of 1853. *Presented by the Society.*

7. Notes on the winding and dying branches of the silk trade at Kurrachee, by Lieut. Stewart, Assistant-Collector; and memo. on the state of the silk trade and manufacture of Peshawur, by Captain H. James, Deputy-Commissioner. *Presented by the Agricultural and Horticultural Society of the Punjaub.*

8. Seeds of the "drooping sissoo" of Bunhoo. *Presented by the Agricultural and Horticultural Society of the Punjaub.*

9. A few seeds of jungle flowering plants from Rangoon. *Presented by Captain G. G. Denniss, 1st European Fusiliers.*

10. Seeds of the Persian Lilac *(Syringa laciniata.)* *Presented by Captain F. C. Burnett, Horse Artillery.*

11. A plant of *Grammatoyllum Finlaysonum.* *Presented by Francisco Pereira, Esq.*

12. A quantity of seed of "Tinnie," or wild paddy, from the Azimghur district, and of acclimated pea seed. *Presented by A. J. Sturmer, Esq.*

13. Half a bale of "Rhea" fibre *(Urtica tenacissima,)* exceedingly well prepared under the superintendence of Major S. F. Hannay, at Dibroghur, Upper Assam. *Presented by the Board of Revenue, through Dr. Falconer.*

Thirteen bales of this very superior fibre are about to be sent to England to the address of the Hon'ble the Court of Directors. It was agreed that a portion of the above half bale be transferred to the Chamber of Commerce, with the request that some of it be forwarded to the Chamber of Commerce at Leeds; further, that the remainder, after reserving a small quantity for the Society's Museum, be placed at the disposal of such of the members of the Society as may be interested in the staple, to enable them to send it to their respective correspondents in England, with the view of bringing it more generally to the notice of the mercantile community.

14. A muster of Seychelles cotton. *Presented by Dr. Mouat.*

Dr. Mouat states that he has received this cotton from the Hon'ble Mr. Bayley, Colonial Secretary at Mauritius, who is desirous of an opinion on its quality. Mr. James Cowell, to whom the sample was referred, is of opinion that it is soft, silky, and of fair length: and suggests an importation of the seed from Sychelles for trial in this coun

Resolved.—That the aid of the Hon'ble Mr. Bayley be requested in procuring a small quantity of the seed (one cwt.) for experimental purposes.

15. A muster of cotton raised at Khalispore Factory, Koolnea, Jessore, from Sea Island seed, received last year from the Society. *Presented by R. W. G. Frith, Esq.*

Mr. Frith mentions that no care has been taken of the plants from which this cotton has been gathered from the time of sowing the seed in November last; but that, if the report is favorable, he will cultivate it more extensively this season.

Mr. Haworth, to whom this muster was handed,—considers that it is sufficiently encouraging to induce an experiment on a larger scale; the cotton appears to him to have a very good staple as regards length, remarkably fine and silky in its texture, and to have retained, with the seed, the characteristics of the original stock.

A fine plant of *Dendrobium Dalhousianum* and one of *Cyrtopera flava* from the Society's Garden, were brought to the notice of the Meeting.

Read the following Report of the Council on the reference made to them at the last Meeting:

"The Council are of opinion that Ch. II, and Ch. X., Section 8, are in no way opposed to the election of an Honorary Member, as a Member of the Council, and that the minutes of the Bye Laws' Committee, and Ch. VI. Section 3, bear out that interpretation."

Proposed by Mr. George Taylor, seconded by Mr. William Haworth, and carried: "that in compliance with the recommendation of the Council, Dr. Huffnagle be elected a member of it in the room of Mr. James Church, gone to England."

The Gardener's Monthly Report was submitted. Mr. McMurray intimates that at the commencement of the distribution season, he will have ready for issue two hundred plants of *Combretum grandiflorum*, raised from seed presented in March last, by Mr. L. Manley: also thirty plants of the white leaved *Poinsettia*, in addition to the plants reserved for Members whose names have been registered; all from the one plant presented by Sir Lawrence Peel, in 1851. The Gardener further reports that he has eleven hundred mango grafts of fifteen kinds, as also a number of other kinds of fruit trees, which will be ready for issue at the commencement of the rainy season to Members at the fixed scale of prices. The number of fruit pods now set on the four flower spikes of *Vanilla planifolia* are, Mr. McMurray states, thirty-seven, varying in length from 4½ to 5½ inches. The Gardener reports that both the varieties of the Tapioca plant in the Society's Garden have flowered this spring; and he is induced to notice the circumstance from seeing it mentioned in the Journal (Vol. VII., p. 241,) that there is no record of the plant having flowered in the Botanic Garden. Mr. McMurray adds, that one of the *Victoria regia* seeds, presented to the Society, by Dr. Wallich in November, 1851, germinated on the 22nd April, 1853. The plant has already (14th May) formed its sixth leaf; and has been planted in the tank at the end of the Rosery.

New Granada Paddy.

Read letters from Mr. Jordan of Liverpool and Mr. Haworth of Calcutta, on the above subject.

Resolved.—That a copy of Mr. Haworth's interesting communication be sent to Mr. Jordan, and that he be requested to obtain a further supply of seed for the Society.

Application of the Drying Process to Sugar-Cane.

Read a letter from Mr. T. F. Henley, and submitted the specimen of sugar, referred to.

Resolved.—That the best thanks of the Society be given to Mr. Henley for the above communication, and that he be requested to continue the experiment every three months, instead of a year hence as proposed, from the dried specimen in the Society's possession.

Communications on various subjects.

The following letters were also submitted :

1. From the Officiating Under-Secretary Government of Bengal, forwarding copy of a letter addressed to Mr. Fortune, at present in China, on the subject of the Society's requisitions, (as contained in the recommendation of the Council, which was adopted at the last General Meeting,) and requesting his best attention thereto.

2. From the Secretary Board of Revenue, L. P., submitting copy of correspondence regarding the Rheea fibre of Assam.

Ordered for publication in the Journal.

3. From Messrs. C. Cantor and C., forwarding the following report, dated 24th March, 1853, from a London broker, on the sample of wool, from the Jhung district of the Punjab, which was received from the Agricultural and Horticultural Society of the Punjab, in November, 1852 :

"The sample of wool from the Punjab, is of a quality indicating a growth of wool likely in the present state of our demand for low wool to meet a ready market here ; it is in very good condition, and though harsh and open, would sell at about 9*d*. per lb.

"The principal objections to it are the kemp or white hair which pervade it, and also its imperfect staple, like half grown wool, probably twice clipped. Supposing these characteristics ameliorated, it is probable the district may yield fleece worth 10*d*. to 1*s*."

Ordered.—That a copy of the above report be forwarded for the information of the Agricultural and Horticultural Society of the Punjaub.

4. From Captain F. C. Burnett, Horse Artillery, Sealkote, dated 18th April, forwarding some seed of the Persian lilac, and asking for various kinds of seed. "I will be much obliged," writes Captain Burnett, "if you will send me some vegetable seeds now for early sowing, and please remember that I have a very large Soldier's Garden, in addition to my own, which is very large now; and, if you can be so good as to send American seed of all but beet, and let that be *Cape*; I find the American beet is not worth growing. Please send me as much beet as you can spare. Do you know that, Dr. Honigberger has gone to Cashmere to grow beet and make sugar? The Cashmere beet is all quite white, and very sweet. My garden is in great beauty now. I have geraniums grown from seed here that are equal to prize geraniums at home. They are now in full flower. I have also a large collection of English bulbs and roots. They are flowering now. My Laburnums are about three feet high, and as healthy as if they were in England. I wish you would send me fruit seeds of all sorts. I have a bed of English seedling strawberries, called, I believe, "British Queen." I get daily about 2½ seers of strawberries, sometimes more or less. I have a number of plants of the double yellow rose from Kishtewar near Cashmere. You will see an account of our flower show in the *Lahore Chronicle*. It would have been better ten days later, as there had been some strong easterly wind before it. I have some very fine French beans. You can buy the seed in Cashmere for three pice a seer. I have distributed a supply of Otaheite sugar-cane that I brought from Lahore. I shall always be glad to have agricultural seeds, tobacco, cotton, &c. I have just reaped 100 beeghas of oats, which are very fine."

5. From Dr. James Allan, Bhaugulpore, on the subject of ornamental pottery ware. "I have succeeded at last in getting the large flower-pots, two to three feet high, made in a style that really are ornaments in gardens, instead of the ugly things they were before. I took the patterns out of the illustrations in *Paxton's Magazine*, and the potters here, who are really clever imitators, have imitated them beautifully, and these, now dotted over the garden walks, filled with *portulacas, verbenas*, &c., add considerably to the beauty of the garden. I shall try next new patterns for trellis work. I may add that my sweet peas this year were eight feet in height, and full of blossom. I do not think they grow much larger in the hills."

6. From H. Cope, Esq., Secretary Agricultural and Horticultural Society of the Punjaub, dated Lahore, 4th April, regarding their silk experiments:— "You may have noticed by the last report of our proceedings that the silk experiment was so far progressing favorably. I have now the pleasure to inform you that the worms have commenced on their cocoons most vigorously, and that every thing promises well."

7. From Baboo Kissory Chand Mittra, Deputy-Magistrate, Jehanabad, acknowledging receipt of ten copies of the *Indian Agricultural Miscellany*,

(Part 1. Vol, I.). and giving a list of the persons to whom he has distributed them.

8. From Baboo Peary Churn Sircar, Secretary, Local Committee, Public Instruction, Baraset, applying for certain descriptions of seeds, and for copies of the *Indian Agricultural Miscellany.*

9. From the Secretary Government of India, forwarding a printed report on the Horticultural Gardens at Ootacamund, Neilgherry Hills.

An estimate from Mr. Sloley for Rs. 80, for two book cases, was passed.

(*Saturday, the* 11*th June,* 1853.)

W. G. Rose, Esq., Vice-President, in the chair.

The proceedings of the last Meeting having been read and confirmed, the following gentlemen were duly elected members by ballot :—

Baboo Rammonee Mohun Chowdry, Lieut. H. P. Bishop, Lord William Hay, Messrs. J. A. Mangles, C. S., and Joseph Shillingford.

The names of the following gentlemen were submitted as desirous of joining the Society :—

A. C. C. DeRenzy, Esq., Assistant-Surgeon, Horse Artillery,—proposed by Major G. C. Armstrong, seconded by the Secretary.

Lieut-Col. H. Garbett, Commanding Artillery Division, Sealkote,—proposed by Capt. F. C. Burnett, seconded by Mr. W. Haworth.

J. R. Barnes, Esq., C. S., Shajehanpore,—proposed by the Secretary, seconded by Mr. W. G. Rose.

Dr. T. C. Jerdon, Surgeon, Madras Cavalry,—proposed by Dr. George Tranter, seconded by the Secretary.

D. Lattey, Esq., Calcutta,—proposed by Mr. John Burkingyoung, seconded by Dr. Huffnagle.

Capt. H. Lewis, Deputy-Commissary of Ordnance, Ferozepore,—proposed by Lieut. H. C. Johnstone, seconded by the Secretary.

R. P. Sage, Esq., Katgurrah Factory, Jessore,—proposed by Mr. W. G. Rose, seconded by Mr. W. Storm.

Lieut. F. W. Brodie, Cavalry, (United Malwa Contingent,)—proposed by Dr. George Tranter, seconded by the Secretary.

Mackintosh Balfour, Esq., Agent at Agra of the Agra Bank,—proposed by Mr. G. B. Robinson, seconded by Mr. L. Balfour.

Captain W. J. Rind, (Invalid Establishment,) Mussooree,—proposed by Captain G. L. Cooper, seconded by the Secretary.

Presentations.

The following contributions to the Library, Garden, and Museum were announced :—

1. A Geological Report on the Kymore mountains, the Ramghur Coal Fields, &c., &c. By D. H. Williams, Esq., (2 copies). *Presented by the Government of Bengal.*

2. Journal of the Asiatic Society of Bengal, No. 2 of 1853. *Presented by the Society.*

3. A small collection of plants from the Royal Botanic Garden, at Mauritius. *Presented by the Superintendent.*

The greater portion of this collection, has unfortunately reached in a very sickly condition.

4. A quantity of Irish filberts and China pear seed. *Presented by Arbuthnot Emerson, Esq.*

5. A collection of hill seeds. *Presented by Capt. T. C. Blagrave.*

6. A few seeds of *Nelumbium luteum* and of *Nymphæa cerulea*. *Presented by G. Bartlett, Esq.*

7. Specimens of juice and fibre from the Muddar *(Calotropis Hamiltonii)* of twine, thread and cloth made from the fibre of raw cotton raised from Mexican seed at Leia on the Indus; and of the common Wool of the country. *Presented by Capt. G. E. Hollings, Deputy-Commissioner in the Punjab.*

Full particulars respecting the above will be found in an interesting communication from Capt. Hollings, published in the Society's Journal, Part 3 of Vol. VIII.

8. Muster of cotton raised at Sealkote (Punjab) from Petti-Gulph seed received from the Society, and cloth made therefrom. *Presented by J. H. Prinsep, Esq., Assistant-Commissioner, Buttala.*

A report from the Translation Committee was read, intimating that they have just passed through the press, the 2nd Part of the first Volume of the "Indian Agricultural Miscellany," in Bengali, and suggesting that the copies be distributed according to the list adopted by the Society on the recommendation of the Council, when the first part was published. Agreed to.

The Gardener's Monthly Report was submitted. Mr. McMurray intimates that he has a good supply of young plants of the American Sumach *(Cæsalpinia coriaria)* ready for distribution among such of the members as may require them:—that the English lilac plants, raised from seed presented by Mr. Emerson, in July of last year, are in good condition, and that the seed of the "Cashmere lilac," *(Syringa laciniata)* received in April last, from Capt. F. C. Burnett, is germinating freely.

[The remainder of the report is occupied with garden details, which it is not necessary to introduce in this place.]

Mr. Rose intimated his withdrawal, by request of the Secretary, of the motion respecting an increase to the Secretary's allowances, of which he gave notice at the General Meeting in March last, and which was still undisposed of.

Communications on various subjects.

1. From the Government of Bengal intimating, that the Government of India, have directed in reference to the report of the Society's Special Committee, that the prize of Rs. 5,000 offered in 1849 for the best cotton-cleaning machine be equally divided between Messrs. Bates, Hyde, and Co., and Messrs. Carver and Co., both of Massachusetts, United States of America, as the successful competitors.

With reference to the recommendation of the Council, it was proposed by Mr. George Taylor, seconded by Mr. Cantor, and *Resolved,*—1st, that the sum of Rs. 5, 000, placed at the disposal of the Society by the Government of India, to be equally divided between the American competitors for the prize offered through the Society in 1849, be sent to the United States Government at Washington, to the parties entitled. That the gold medal of the Society be awarded to each of the two competitors, viz., Messrs. Carver and Co., and Messrs. Bates, Hyde and Co., both of Massachusetts. That the Secretary of the Society be directed to transmit the amount awarded, together with the medals, to Mr. Huffnagle, the American Consul at Calcutta, with a request that he will be good enough to forward the same in accordance with these resolutions, and lastly, that the Society purchase these two machines at the cost price of construction.

2. From J. H. Prinsep, Esq., Assistant-Commissioner at Buttala, in the Punjab, dated 22nd May, advising despatch of the muster of raw cotton and cloth, alluded to among the contributions, and giving particulars of his experiments.

3. From Captain G. E. Hollings, Deputy-Commissioner, Shahpore, Punjab, dated May 25, forwarding some excellent impressions of coins obtained by means of the hardened juice of the Mŭddār plant.

4. From Messrs. W. H. Harton and Co., submitting with reference to their former notice, regarding "Jubbulpore hemp," a report on certain kinds of rope of their manufacture, tested in the arsenal of Fort William. Messrs. Harton mention having seen a statement, in Col. Forbes' possession, of the comparative strength of superior Russian hemp and wire rope, and suggest an application for a copy to make the Society's information more complete. Agreed that an application be made to Col. Forbes on the subject.

5. From T. M. Robinson, Esq., Secretary Chamber of Commerce, acknowledging receipt of the bundle of the Rheea Fibre of Assam, which has been forwarded to the Chamber, in accordance with the resolution passed at the last Meeting of the Society:—"The Committee," writes Mr. Robinson, "will forward the specimen to England, and endeavour to obtain a thorough practical report upon its qualities and value as an article of trade, and in due time communicate the results to your Society. The Committee will be most happy at all times to co-operate with your Society in promoting the

objects common to both institutions, by taking upon themselves the task of procuring you reports on any new articles of produce, or generally in any other manner that you may be able to suggest."

6. From Messrs. Purrier and Co., Agents General Screw Steam Shipping Company, submitting extract of a letter from the Directors of the Company, in which they state, in reply to the Society's application for free freight for seed to the extent of one ton annually, that they will be prepared "to take seeds for the Society, at half the usual rates, provided the quantity shipped does not exceed two tons in weight."

It was agreed, on the recommendation of the Council, to prefer a second application to the Company, to allow the Society, in lieu of the above, the same privilege as has been accorded since 1850 by the Peninsular and Oriental Steam Navigation Company, viz., *one ton annually free of freight.*

7. From Dr. Wallich, submitting copy of correspondence between himself and the Directors of the General Screw Shipping Company on the above subject.

8. From the same on the subject of seed required by the Society.

9. From Baboo Prosononauth Roy, of Nattore, acknowledging receipt of twenty-five copies of the *Indian Agricultural Miscellany* in Bengali, and stating how he has distributed them.

10. From Baboo Kalee Chunder Roy of Rungpore, giving a distribution list of ten copies of the above work which were forwarded to his care.

11. From Dr. D. J. Macgowan, dated Ningpo, 16th February, intimating his intention of forwarding, by the first favourable opportunity, a lot of specimens for the Society's museum.

(*Saturday, the 9th July*, 1853.)

W. G. Rose, Esq., Vice-President, in the chair.

The proceedings of the last Meeting were read and confirmed; and the following gentlemen, who were proposed on that occasion, were duly elected Members :—

Dr. A. C. C. DeRenzy; Lieut.-Colonel H. Garbett; Dr. T. C. Jerdon; Messrs. J. R. Barnes, D. Lattey, R. P. Sage and M. Balfour; Captain H. Lewis; Lieut. F. W. Brodie and Captain W. J. Rind.

The names of the following gentlemen were submitted as desirous of joining the Society :—

Wm. Tayler, Esq., C. S., Arrah,—proposed by Mr. A. Grote, seconded by Mr. W. H. Elliott.

Lieut-Colonel E. Lugard, C. B., Assistant-Adjutant-General, H. M. Forces,—proposed by Dr. Falconer, seconded by Mr. Grote.

T. E. Ravenshaw, Esq., C. S., Secretary Public Garden, Monghyr,—proposed by the Secretary, seconded by Mr. W. G. Rose.

Presentations.

The following contributions to the Library, Museum and Garden were announced :—

1. Journal of the Indian Archipelago for January, 1853. *Presented by the Editor.*

2. A copy of the same work for the same month. *Presented by the Government of Bengal.*

3. A few printed copies of a little brochure, entitled. "A brief notice concerning the Agricultural and Horticultural Society of India. By Dr. N. Wallich." (Reprinted from Hooker's Journal of Botany for May, 1853.) *Presented by the Author.*

4. A specimen of "Garancine," prepared from Munjeet, or Indian Madder, *Rubia Munjista*, Roxb *Presented by T. F. Henley, Esq.*

5. Fourteen kinds of Chrysanthemum plants, five kinds of Rose cuttings, and a few seeds of sorts. *Presented by George Bartlett, Esq.*

6. Six kinds of Rose plants. *Presented by A. DeCruz, Esq., Junior.*

7. Three sorts of plantain (Cavendish, Red Cavendish, and Dacca) China and Burma Bamboo shoots, and cuttings of a white Mulberry, all from the Barrackpore Park. Received from Mr. Cockburn, Superintendent of the Park.

8. A fine collection, consisting of sixty-six kinds of acclimated flower seeds, raised at Peepra Factory, Champarun. *Presented by G. N. Wyatt, Esq.*

A recommendation was brought up from the Council for disposal at the next meeting, that Mr. Stewart Douglas fill the vacancy in the Council, caused by the departure of Mr. T. F. Henley for Europe.

The Gardener's Monthly Report was submitted. Mr. McMurray gives a list of tree and shrub seedlings, raised last year from the North American and Australian seeds, purchased by the Society, which have stood out the late trying hot season. Of these seedlings a few plants of three kinds are available for distribution. The Gardener refers to several late contributions to the garden; and adds that two more seeds of *Victoria regia*, of the packet presented by Dr. Wallich in November, 1851, have germinated, and that the old plant has formed its twenty-fourth leaf, and is doing well.

In connection with the above report, a notice was brought up from the Council, recommending that certain alterations be made in the Garden establishment, as proposed by the Garden Committee, consequent on the demise of one of the head *mallees*, and that, with reference to the high character borne by him, a gratuity of Rs. 18, be awarded to his widow. Agreed to.

Read a letter from Mr. T. F. Henley, dated on board the Screw Steamer *Bombay*, near Kedgeree, 17th June, and submitted the sample of Indian Garancine therein alluded to.

It was resolved, on the recommendation of the Council, to forward a copy of Mr. Henley's interesting communication to the Bengal Chamber of Commerce, with a sample of the Garancine, and to request the particular attention of that body to the points mooted in his letter.

Communications on various subjects.

The following communications were likewise submitted :—

1. From J. W. Payter, Esq. Zemindar, at Bogra, dated 20th June, applying for cuttings of Mauritius Sugar-cane. Mr. Payter gives the following particulars of his experience of this variety of cane. "For several years past the introduction of this superior kind of cane has rapidly increased from the portions that I originally brought up but it has very much deteriorated, inasmuch that it is considerably thinner, indeed last season so much so as to be barely double (on an average) of the better sorts of country cane. I have remarked too that, as it degenerates in each successive year's growth, it changes colour, and from white becomes a light red the first year, the next, a deeper colour, and the third and fourth years a deep purple. I know not whether this has been noticed by others or not, but it certainly is the fact; whether this is owing to its intermixture with the country cane, the closeness of planting, or the entwining the trash round the stems and enveloping a number of clumps in one, I am unable to say ; it is, however, very satisfactory to know that in spite of these drawbacks, the superiority of it to the country cane is paramount in the manufacture of the goor, both in quantity and quality ; and I could not give you a better proof of this fact than what I now do, in begging for any quantity that can be spared for the conveyance of which the ryots have agreed to pay all expenses."

2. From Dr. Campbell, Darjeeling, applying for another parcel of New Granada paddy seed expected from Mr. Jordan, with the view of giving it another trial, at a lower elevation than the former experiment was made. "I am satisfied," observes Dr. Campbell, "that Mr. Haworth made a very careful examination of the Granada rice grown by me here, as his supposition regarding its unripeness, when cut, was quite correct. I was obliged to cut it, although perfectly unripe, as it ceased to ripen from the coldness of the weather. It is on this account, as well as to ascertain if the rice maintains its distinguishing property of yielding three or more crops in one year, that I trouble you with this request for a fresh parcel of it."

The Secretary notified that Dr. Campbell's name had been duly registered for a portion of the next supply.

3. From Rajah Pertaub Chunder Sing, V. P., submitting a list of persons to whom he has distributed the twenty-five copies of the *Indian Agricultural Miscellany* in Bengali, Part 1 of Vol. i, which had been entrusted to his care.

4. From H. Davidson, Esq. C. S., dated Loodiana, 17th June, respecting the various useful properties of the Mŭddār plant, (*Calotropis Hamiltonii.*) Mr. Davidson states :—"I have lately seen in the Society's Journal several

notices of the properties of the juice of the Mŭddār; how they resemble those of Gutta Percha. The plant abounds in the sandy soil of this part of the country, and my attention has been drawn to the remarkably fine silken character of the contents of the pod of this wild plant. 'It is finer in comparison with the cotton plant than any manufactured silk that I have ever seen. It might be interesting if some of the Society's correspondents would satisfactorily test whether or not the contents of the pod are capable of being made subservient to any use. The natives here have no use for it."

The Secretary mentioned that he had brought to Mr. Davidson's notice, Mr. Monckton's paper on this subject, published in the seventh volume of the Society's Journal.

5. From Professor E. Solly, Secretary Society of Arts, London, dated May 2nd, advising dispatch of certain copies of the transactions of the Society of Arts, to aid in completing the Society's Library.

These volumes, thirteen in number, have just been received.

6. From Messrs. Purrier and Co. Agents, G. S. S. S. Company, intimating that a copy of the Secretary's letter, respecting free freight to the Society to the extent of one ton annually, will be sent to their Directors without loss of time.

(Saturday, the 13th August, 1853.*)*

W. G. Rose, Esq., Vice-President, in the chair.

The minutes of the last month's proceedings were read and confirmed.

The following gentlemen, who were proposed at the last meeting, were elected members:

W. Tayler, Esq., C. S.; Lieut.-Col. E. Lugard, C. B.; and T. E. Ravenshaw, Esq., C. S.

The names of the following gentlemen were submitted, as desirous of joining the Society:—

J. F. Hedger, Esq., Khal Bolia Factory, Kishnaghur,—proposed by Mr. R. T. Larmour, seconded by Mr. James Forlong.

W. Jameson, Esq., Superintendent H. C. Botanic Gardens, N. W. P.,—proposed by Major E. J. Dickey, seconded by the Secretary.

Charles Steer, Esq., C. S., Backergunge,—proposed by the Secretary, seconded by Mr. W. G. Rose.

T. D. Lushington, Esq., Madras C. S., Masulipatam,—proposed by Captain H. W. Blake, seconded by Captain W. G. Owen.

E. B. Foord, Esq., Madras C. S., Vizianagram,—proposed by Captain W. G. Owen, seconded by the Secretary.

W. Blundell, Esq., (Firm of Leach, Rawson and Co.,)—proposed by Mr. Joseph Willis, seconded by Mr. W. G. Rose.

Captain D. Morrieson, (52nd Regiment N. I.,) Political Agent, Bhurtpore,—proposed by the Secretary, seconded by Mr. Geo. Taylor.

Captain J. C. Curtis, Comg. 6th Irregular Cavalry, Sealkote,—proposed by Captain F. C. Burnett, seconded by the Secretary.

Major Percy Eld, Comg. at Abazie near Peshawur,—proposed by the Secretary, seconded by Mr. F. Pereira.

Crawford Strover, Esq., (Jessore,)—proposed by Mr. R. W. G. Frith, seconded by the Secretary.

Major Archibald Little, Comg. 9th, Lancers, Umballa,—proposed by the Secretary, seconded by Mr. Geo. Taylor.

E. Colebrook, Esq., Pleader Sudder Court,—proposed by Baboo Peary Chand Mittra, seconded by Baboo Rajendralall Mittra.

Mr. Adam George, Calcutta,—proposed by Baboo Peary Chand Mittra, seconded by Baboo Rajendralall Mittra.

S. F. Seymour, Esq., Calcutta,—proposed by the Secretary, seconded by Mr. W. G. Rose,

The Rajah of Kapoorthulla Alloowallea,—proposed by Mr. J. Naesmyth, C. S., seconded by the Secretary.

Presentations.

The following contributions were announced:

1. A sample of vegetable wax, and a few berries of the shrub, brought from the Cape of Good Hope. *Presented by Captain Charles E. Burton, Political Agent at Kotah.*

2. Specimens in different shapes of the juice of the Mŭddār *(Calotropis Hamiltonii). Presented by Dr. R. Riddell, Superintending-Surgeon Nizam's service.*

3. A large specimen of Mŭddār Gutta Percha. *Forwarded by Captain G. E. Hollings.*

Captain Hollings forwards this specimen "with the view of ascertaining through the Committee of the Society or the Chamber of Commerce, if it be such an equivalent for the Gutta Percha of commerce as is alluded to in the offer of premiums by the Society of Arts in London. I should like to know what price the article would fetch in the English market, and if there would be any demand for it in Calcutta."

Resolved.—That the specimen in question, with a copy of Captain Hollings' note, be forwarded to the Society of Arts.

4. Specimen of the prepared juice of the plant alluded to in his former communication, submitted at the April meeting, and also specimen of the plant itself. *Presented by Dr. A. H. Cheek, Civil Surgeon, Cawnpore.*

Dr. Falconer recognizes the plant as *Euphorbia ligularia* [Munsa-shij of Bengal], and states that the substance in question is nothing like Gutta percha, but what the French call a coreo-resine.

5. Specimens of native cotton and seed of the fourth year's crop. *Presented by Charles Gubbins, Esq.*

6. A sample of twine made from flax. *Presented by C. Gubbins, Esq.*

7. A small assortment of flower seeds prepared by Mr. Thomas P. Boyes of Hamburg. *Presented by W. Earle, Esq.*

Mr. Earle forwards these seeds with the view of having them tested in comparison with those furnished by the Society's seedsman, Mr Carter of London.

The recommendation of the Council, of which notice was given at the last General Meeting, proposing Mr. Steward Douglas to fill the vacancy in the Council caused by the departure of Mr. Henley to Europe, was adopted.

The Gardener's Monthly Statement was submitted. Mr. McMurray reports that 32 out of the 34 kinds of Cape vegetable seeds of this season's consignment have germinated freely. Since the date of his last report, 15 more of the *Victoria regia* seeds, presented by Dr. Wallich in November 1851, have germinated. Nine plants of the total number (18) now in the Garden have been planted out in the two tanks adjoining the rosery, and more mounds have been prepared for planting out the other nine plants, so soon as they are large enough for that purpose. The number of leaves produced by the plant that was placed out on the 13th May last, are 35, and the largest leaf produced up to the 12th instant is four feet one inch in diameter. The Gardener alludes to a few recent contributions to the Garden, among them a *Poivrea* plant, supposed to be a new species, received from Mr. A. DeCruz, Junior, and a very large and superior kind of plantain from Assam, presented by Mr. J. E. Burton. Mr. McMurray adds, in conclusion, that the whole of the peach trees which suffered so much last year are doing well this season. The American apple trees are growing vigorously, and the majority of the fruit-trees, shrubs, &c., in the Garden have made a healthy growth during last month.

Communications on various subjects.

The following communications were also submitted :—

1. From Lt. W. H. Lowther, dated Meerut, 10th July, forwarding a paper on the natural productions of the valley of Cashmere.

Referred to the Committee of Papers.

2. From Dr. R. Riddell, dated Bolaram, 4th of May, regarding the oil obtained from the kernel of *Juglans camirium*, more commonly known in Bengal as *Aleurites triloba* :—

3. From Capt. F. C. Burnett, Horse Artillery, dated Sealkote, 31st May :—

"I am much obliged to you for the seeds which arrived safe, and a few days after your letter of the 18th inst., from which I am glad to see that you have registered my name for the agricultural seeds, and that you will endeavour to get a frank. I regret to say that the large quantity of cotton seed you sent me last has failed: this is very provoking on my first attempting to introduce it, I hope the next supply will be better. I fear also very few of the seeds last sent from the H. C. Botanical Garden will germinate, not one of the *Poinciana regia*, though I soaked some in warm water; the *Combretum grandiflorum* has come up well. I wish you would be so good as to send me some Cinchona seed whenever you have any, as well as any thing new. I am sorry I cannot send you any strawberry seed as the English seedlings have not borne fruit this year. Our strawberries are now in full bearing, the produce of one day from Major Houghton's garden and the 63rd N. I. yielded 16½ seers between them. Major H. also sent me to-day 3 very fine apricots grown in his own garden. I will send you cuttings of the yellow and other roses in the cold season, and have no doubt they will do well. I wish I had some cuttings of the *white* poinsettia, but the best season will be January to send them."

In a subsequent letter, dated 15th July, Capt. Burnett adds:—

"Two seeds of the *Cordia sebestena* have germinated, but not one of the *Poinciana regia*, which I am very sorry for. I hope you will not fail to send me any seeds you may have to distribute, as this soil and climate seems very favorable for both English and Tropical plants I was sorry to see that the *Victoria regia* in the H. C. Botanical Garden had died. I think it would succeed well in the Cashmere lakes. I find the plane tree is very difficult to rear here, as the white ants are very partial to it. Out of about 300 trees I have planted, only about 50 are alive. The Peshawur Poplar does well, and is a very handsome tree; the upper side of the leaf is a dark green, and the other side quite white. I will send you some cuttings."

4. From W. G. Young, Esq., Under-Secy. Govt. of Bengal, dated 30th July, submitting copy of a communication from the Secy. to the Govt. N. W. P., preferring an application from Mr. C. H. Brown, of Mirzapore, for one or both of the American cotton-cleaning machines, to which the Government prize has lately been awarded. The following is a copy of Mr. Brown's letter:—

"I have lately observed in the papers copies of some correspondence regarding the cotton-cleaning machines which gained the prize of 5,000 rupees offered by Government, and as Mr. Thomason declined the proposal that they should be made over to him on the ground that he had no means of giving them a fair trial, either at Mirzapore or Agra, I take the liberty of writing you to say that should the Lieut.-Governor be inclined to make over one or both of the said machines to my firm, we would undertake to give them a fair trial at Calpee, and in the event of there being any good ground to look for a favorable result, we would test the value of the cotton so cleaned, both in the English and China markets. Mirzapore is not a place suitable for the experiment, as no kapass comes here, while at Calpee it is procurable in any necessary quantity. Should the Lieut.-Governor view this proposal favorably, there would, I imagine, be no difficulty in having the machines sent to this place by Government steamer, and we would undertake their transport from this to Calpee."

The meeting fully agreed, in conformity with the opinion of the Council on the above letter, that it would be very inconvenient to allow models of which the Society does not possess duplicates, to be sent out of Calcutta, as such a practice might interfere with applications from other quarters; but that every facility be afforded Mr. Brown for the manufacture of other machines similar to those now applied for.

5. From T. M. Robinson, Esq., Secy. Chamber of Commerce, acknowledging receipt of Mr. Henley's communication on the subject of munject, together with a specimen of Garancine, and intimating in reply that the Committee "will make every enquiry possible to ascertain if the garancine can be made use of as a dye to an extent to render the article munject more valuable."

It was agreed, on the recommendation of the Council, to forward a copy of Mr. Henley's paper with specimen, to the London Society of Arts.

6. From Dr. Falconer, submitting an application from Major H. Fraser, the Supg. Engineer in Pegu, for a series of the Society's Journal, and other publications, free of charge, for the "Pegu Library."

It was resolved, on the recommendation of the Council, to meet this application, as far as the means of the Society will admit.

7. From Col. W. N. Forbes, Mint Master, furnishing the information sought for by the Society, viz: the comparative strength of Russian Hemp and Wire Rope.

8. From Lieut. John Ross, Brigade Major, Peshawur, forwarding a remittance for sixty rupees, being the amount due by him to the Society, for his arrears of subscription.

9. From Messrs. C. M. Villet and Son, Cape of Good Hope, advising despatch of the Society's consignment of vegetable seeds.

10. From Mr James Carter, London, advising despatch of consignments of flower seeds.

(Both the above consignments are in course of distribution.)

11. From Mr. D. Landreth, dated Philadelphia, May 20th, announcing that he has shipped per *Marcellus* the Society's consignment of vegetable maize, cotton and tobacco seeds. Mr. Landreth states: "This is the first ship direct since the seeds were prepared and forwarded to Boston early in April. Several opportunities *viâ* Bombay and Madras, have been presented, but, on consultation with our correspondent, it was deemed most advantageous to await a ship direct. I greatly regret the unavoidable delay, but as she is now off some days, I trust the seeds may reach you in good season."

(Saturday, the 10th September, 1853.)

W. G. Rose, Esq., Vice-President, in the chair.

The minutes of the last month's proceedings having been read and confirmed, the following gentlemen, proposed on that occasion, were duly elected members :—

Messrs. J. E. Hedger ; Chas. Steer, C. S. ; T. D. Lushington, C. S. ; E. B. Foord, C. S. ; W. Blundell ; Capt. D. Morrieson ; Dr. Wm. Jameson ; Capt. J. C. Curtis ; Major Percy Eld ; Major Archibald Little ; Messrs. Crawford Strover ; E. Colebrooke ; Adam George ; S. F. Seymour, the Rajah of Karpoorthulla Alloowallea.

The names of the following gentlemen were submitted as desirous of joining the Society :—

A. H. Cocks, Esq., C. S., Mynpooree,—proposed by Mr. W. G. Rose, seconded by Mr. C. A. Cantor.

T. P. Larkins, Esq., C. S., Sylhet,—proposed by Dr. K. M. Scott, seconded by the Secretary.

Baboo Gyanendro Mohun Tagore, Zemindar,—proposed by Baboo Peary Chand Mittra, seconded by Mr. W. G. Rose.

R. Morrell, Esq., Zemindar, Backergunge,—proposed by Mr. Rose, seconded by Mr. Cantor.

Wm. Grant, Esq., firm of Messrs. Gladstone, Wyllie and Co.,—proposed by Dr. Falconer, seconded by Mr. Grote.

Dr. R. Riddell, Superintending Surgeon, Nizam's Service, was proposed on the recommendation of the Council, as a Corresponding Member.

Presentations.

The following contributions were announced : –

1. *Hortus Madraspatensis.* Catalogue of plants, indigenous and naturalised, in the Agri-Horticultural Society's Gardens, Madras. *Presented by Dr. Cleghorn.*

2. Brief hints for the culture in India of Fruit Trees, and the rearing of Vegetable and Flower Seeds. By Mr. McIver, Superintendent Horticultural Gardens, Ootacamund. *Presented by the Government of Bengal.*

3. Journal of the Asiatic Society of Bengal, Nos. 3 and 4 of 1853. *Presented by the Society.*

4. Selections from the Records of the Govt. of Bengal, No. XI. "Report on the Political States, S. W. F. Agency ; Revenue Administration of Assam ; and the wild tribes bordering the S. Frontier of Chittagong ;" and No. XII. "Embankments of the Damooda." *Presented by the Govt. of Bengal.*

5. A small collection of Orchids from Sylhet. *Presented by Dr. K. M. Scott.* These have unfortunately reached in bad condition.

6. One walnut and two grape seedlings, raised at Benares from Cabul seed. *Presented by Major R. Ouseley.*

7. A plant of *Musa textilis*, from which the 'Manilla Hemp' is obtained. *Presented by G. Ackland, Esq.*

8. Twelve China plum grafts and one China walnut tree. *Presented by Arbuthnot Emerson, Esq.*

9. A Collection of handsome cut specimens of Balsams, raised from German seed; and a plant of *Gomphrena species superba*, were submitted by Mr. George Bartlett, as the produce of his garden.

The Gardener's usual Monthly Report was read. Mr. McMurray submits a tabular statement of the sowings of the Cape vegetable seeds, which, with the exception of parsnip and lettuce, which have totally failed, have germinated very fairly, showing a general average of 68 per cent. Of the English flower seeds, 47 of the 71 kinds sown, have germinated freely; the remaining 24 kinds, have not been sufficiently long in the ground to offer an opinion on, but a tabular statement of the whole will be submitted in the next report.

The gardener gives, in continuation of his last month's Report, the following particulars respecting the *Victoria regia*, now flowering in the garden:

"It will, no doubt, be gratifying to the Society to learn, that one of the *Victoria regia* plants, raised from the seed presented to the Society by Dr. Wallich in November 1851, is now flowering in the tank at the north side of the rosery. Without lengthening this report by giving a detailed statement of the plant, at the present time, it may be deemed sufficient to mention that the seed which produced this plant was ripened and gathered from the plant at Syon House on the 9th September, 1851; received and sown in this garden on the 6th November, 1851, where it lay in a dormant state until the 23rd April, 1853, when the plant in question was produced. On the 13th May last, the seedling had made a healthy growth, and was transferred on that date to the mound prepared for it in the tank. The largest leaf, when planted out, was rather more than three inches in diameter, the total number of leaves produced up to the 5th instant (September,) are forty-four; fifteen of which were on the plant, in different stages of development, when the first flower had made its appearance on the surface of the water, and the largest leaf produced up to that time measured 4 feet 5½ inches in diameter. The first flower-bud appeared partly above the water on the morning of the 6th instant, and by sunset the same evening had partly expanded the flower, which closed up the next morning, and finally opened again at sunset the same evening. This sudden expansion of the flower has again taken place with the second flower produced by the plant on Friday morning last, (the 9th inst.) The difference between the growth and habit of this plant, in comparison with the memorandum published, in part 1, Vol. viii, page 17 of the Society's Journal, on the Botanic Garden *Victoria regia* plant, is very great, both in the number and size of the leaves; although it will be seen that there is only a difference of one day in the season between the two plants showing their first flowers; the Botanic Garden plant having flowered on the 5th of September, 1851, and the Society's on the 6th of September, 1853."

Communications on various subjects.

The following letters were likewise submitted.

1. From James Cowell, Esq., reporting on the musters of indigenous cotton and flax twine, made from the refuse stalks of the linseed plant, which were presented by Mr. C. Gubbins at the last Meeting.

2. From Willis Earle, Esq., (two communications) dated Liverpool, June 28, and July 18, on the subject of the importation of rare plants in Ward's cases, and on other matters connected with seeds. (Referred to the Floricultural Committee.)

3. From Messrs. Hamilton, Higginson and Co., of Mirzapore, applying for information regarding the working and the cost of construction of the American Sawgins, to which the Government prize was awarded.

Resolved.—That a copy of the Special Committee's Report be furnished to Messrs. Hamilton, Higginson and Co.

4. From Colonel Forbes, Mint Master, intimating that the Society's Medal dies are not in a fit state for repair. Agreed, on the recommendation of the Council, that the necessary steps be taken to procure a new set.

5. From Baboo Peary Churn Sircar, Secretary Local Committee Public Instruction, Baraset, dated 18th August, reporting progress of the Agricultural class of the Baraset School, and asking for seeds, grafts, &c., and for an additional supply to encourage cultivators in the vicinity.

Resolved.—On the recommendation of the Council, that an additional quantity of seeds be granted to the Baraset Institution, with the view of enabling them to distribute a portion among the cultivators in the neighbourhood, and that the Secretary be requested to report the result, in due course, to the Society.

6. From Lieut.-Col. F. Jenkins, enclosing a letter from Dr. J. Campbell, of Tezpore, seeking for any additional information about Munjeet Garancine. It was agreed that Dr. Campbell's request be complied with, when the result of the Society's application to the Society of Arts is communicated.

Letters were also read from Dr. Mouat, Secretary Council of Education, from H. V. Bayley, Esq., Collector 24-Pergunnahs, and from Baboo Mohenchunder Ghose, Sheristadar, Board of Revenue, giving distribution lists of the Indian Agricultural Miscellany, Part 2 of Vol. i.

It was agreed, on the recommendation of the Council, that an application be made to Colonel Sleeman, Resident at Lucknow, for a collection of peach grafts of the best sorts for the Society's Garden, and that the necessary expenses for procuring them be authorized.

It was further agreed that the next monthly Meeting be held on Saturday, the 1st October, instead of on Saturday the 8th, which would interfere with the approaching long vacation.

UNIVERSAL LIFE ASSURANCE SOCIETY.

ESTABLISHED IN LONDON AND CALCUTTA, 1834.

Confirmed by Special Act of Parliament 6 *William IV. Chapter* 64.

Invested Capital £630,000, of which 46 Lacs of Rs. are held by the Indian Branch.

London Office, No. 1. *King William Street.*

Chairman.—SIR HENRY WILLOCK, K. L. S.

Actuary.—DAVID JONES, ESQ.

Indian Branch.

Directors.

C. R. PRINSEP, ESQ. W. H. SMOULT, ESQ.
W. W. KETTLEWELL, ESQ. WILLIAM CAREY, ESQ.
JAMES JOSEPH MACKENZIE, ESQ.

Physician.—JOHN JACKSON, ESQ.

Agents and Secretaries.—MESSRS. BRADDON AND CO.

Madras Agent.
MESSRS BAINBRIDGE & CO.

Bombay Agent.
MESSRS. LECKIE, & CO.

1.—The marked success which has attended the operations of this Society, justifies the Directors in calling the attention of the public, to the peculiar advantages held out by this Institution to all classes desirous of effecting assurance upon lives.

2.—The Tables of premium have been framed with the greatest care. Those applicable to Indian lives have been especially prepared from the experience of Indian mortality, and from the records of the East Indian Government, and are as moderate as is deemed consistent with perfect security.

3.—Proposals are received for Insurances for the whole term of life either on a *participating scale*, or on a *non-participating scale at a lower rate of premium.* Also for short periods varying from one to seven years on *very moderate terms.*

4.—An annual division is made of one-fifth of the ascertained profits of the five preceding years, the other four-fifths being set apart to enter into the average of succeeding years.

5.—Of the sum annually divisible *seventy-five per cent.* is apportioned to policy-holders on the participating scale, who have paid six annual premiums, and these profits can be applied either in reduction of subsequent premiums, or as a bonus to the original amount of the policy The remaining *twenty-five per cent.* of the profits is apportioned to the share-holders.

6.—During the last twelve years the reduction of Premium on policies entitled to participate in profits has averaged more than 44 per cent., and during the last three years it has been declared at the rate of 45 per cent. on the original annual amount.

7.—The following table will shew the result of the last division of profits as declared on the 11th May, 1853.

Age.	Date of Policy.	Sum Assured.	Original Annual Premium.	Reduction.	Reduced Annual Premium.
		Co.'s Rs.	Co.'s Rs.	Co.'s Rs	
20	on or before the 11th May, 1848.	10,000	420	189-0	231-0
30		10,000	480	216-0	264-0
40		10,000	590	265-8	324-0
50		10,000	740	333-0	407-0
60		10,000	1,030	463-8	566-8

8.—Following is an Extract of the rates of premium for short term Policies and for Assurances for life *without* participation in profits.

ANNUAL PREMIUM FOR AN ASSURANCE OF RUPEES 1,000.

Civil.

Age.	1 year.	3 years.	5 years.	7 years.	Life without profits.
20	22	22	23	24	32
30	27	28	28	29	39
40	32	32	32	33	49
50	38	40	40	43	62
60	51	52	56	60	88

Military.

Age.	1 year.	3 years.	5 years.	7 years.	Life without profits.
20	26	27	28	28	36
30	32	32	33	34	45
40	39	40	40	40	53
50	45	46	47	48	64
60	56	57	60	64	90

9.—On return of Assurers to Europe for a permanent residence, their premiums are immediately reduced to the English rates, both on the *participating* and *non-participating* scales.

10.—Military Officers holding civil appointments are allowed to subscribe at the civil rates of premium.

11.—Premiums are payable either annually, half-yearly, or quarterly, and a grace of 28 days is allowed for such payments.

12.—Medical referees are remunerated by the Society.

13.—At the period of last annual valuation, the Assets of this Society were ascertained to be upwards of £630,000. The amount of Policies in force about £2,000,000, and the annual income arising from premiums thereon £90,000, exclusive of interest on the invested capital.

BRADDON AND CO.
CALCUTTA, *November* 1, 1853. *Agents and Secretaries.*

Indian Rates of the Universal Life Assurance Society.

TABLE NO. 1.—CIVIL SERVICE.

Annual Premiums required for the Assurance of 1,000 Rs. for periods from One to Seven years, on the Lives of persons in the H. C. Civil Service, and others not exposed to the hazards of Military and Maritime occupations, *without participation* in the Profits of the Society.

Age.	One year.	Three years.	Five years.	Seven years
18	21	22	23	23
19	22	22	23	24
20	22	22	23	24
21	22	23	24	24
22	23	24	24	24
23	23	24	21	25
24	24	24	25	26
25	24	24	25	26
26	21	25	26	27
27	25	26	27	28
28	26	27	28	28
29	27	28	28	28
30	27	28	28	29
31	28	28	29	29
32	28	29	29	30
33	28	29	30	30
34	28	29	30	31
35	30	30	31	31
36	30	30	31	32
37	31	31	32	32
38	31	32	32	32
39	31	32	32	32
40	32	32	32	33
41	32	32	33	34
42	32	32	34	35
43	33	34	35	36
44	34	35	35	36
45	34	35	36	38
46	35	36	36	39
47	36	36	38	40
48	36	37	39	40
49	37	39	40	42
50	38	40	40	43
51	40	40	42	44
52	40	42	44	45
53	42	44	44	47
54	43	44	46	48
55	44	45	48	48
56	45	47	48	50
57	46	48	50	52
58	48	50	52	54
59	49	51	54	56
60	51	52	56	60

TABLE NO. 2.—MILITARY AND NAVAL.

Annual Premiums required for the Assurance of 1,000 Rs. for periods from One to Seven years, on the Lives of persons exposed to the hazards of Military and Maritime occupations, *without participation* in the Profits of the Society.

Age.	One year.	Three years.	Five years.	Seven years.
18	25	25	26	27
19	26	26	27	28
20	26	27	28	29
21	27	28	28	28
22	28	28	28	29
23	28	28	29	30
24	28	28	29	30
25	28	29	30	31
26	29	30	31	32
27	29	30	31	32
28	30	31	32	32
29	31	32	32	33
30	32	32	33	34
31	32	33	34	35
32	32	34	34	36
33	33	35	36	36
34	34	36	36	37
35	35	36	37	38
36	36	36	37	38
37	36	37	38	39
38	37	38	39	40
39	38	39	40	40
40	39	40	40	40
41	40	40	40	41
42	40	40	41	42
43	40	41	42	43
44	41	41	43	44
45	42	42	43	44
46	43	43	44	44
47	43	44	44	45
48	44	44	45	46
49	44	45	46	48
50	45	46	47	48
51	46	47	48	49
52	47	48	49	50
53	48	49	50	52
54	49	50	52	52
55	50	51	52	53
56	51	52	53	55
57	52	53	55	56
58	53	55	56	58
59	54	56	58	60
60	56	57	60	64

*** *Premiums are received in half-yearly payments for the convenience of the Assured, but in case of lapse the full premium of the current year will be charged.*

Table No. 1. Example.—A person aged 30, may, by paying 27 Rs., secure 1,000 Rs. to his representatives, if his death should occur within *one* year; if within *five* years by paying 28 Rs. annually, and if within *seven* years, by paying 29 Rs. per annum.

Table No. 2, Example.—A person aged 30, may by paying 32 Rs. secure 1,000 Rs. to his representatives, if his death should occur within *one* year; if within *five* years by paying 33 Rs. annually, and if within *seven* years by paying 34 Rs. per annum.

UNIVERSAL LIFE ASSURANCE SOCIETY.

WHOLE LIFE.

Age	CIVIL.		MILITARY AND NAVAL.		ENGLISH RATES.		Age
	TABLE No. 3. Annual Premiums required for the Assurance of 1,000 Rs. with participation in profits, and reduction of Premium on return to Europe.	TABLE No. 5. Annual Premiums required for the Assurance of 1,000 Rs. *without participation in profits, but with reduction of Premium on return to Europe.*	TABLE No. 4. Annual Premiums required for the Assurance of 1,000 Rs. with participation in profits, and reduction of Premium on return to Europe.	TABLE No. 6. Annual Premiums required for the Assurance of 1,000 Rs. *without participation in profits, but with reduction of Premium on return to Europe.*	Annual Premium for assuring £100, for the whole of life, with participation in profits. Inserted as a guide to persons insured in India under Tables Nos. 3 and 4.	Annual Premium for assuring £100, for the whole of life, without participation in profits. Inserted as a guide to persons insured in India under Tables, Nos. 5 and 6.	
18	41	31	45	34	1 17 2	1 13 6	18
19	42	32	46	35	1 17 11	1 14 2	19
20	42	32	47	36	1 18 8	1 14 10	20
21	43	33	48	37	1 19 6	1 15 7	21
22	43	34	49	38	2 0 5	1 16 5	22
23	44	35	49	39	2 1 4	1 17 3	23
24	44	36	50	40	2 2 3	1 18 1	24
25	45	36	51	41	2 3 3	1 19 0	25
26	46	37	51	42	2 4 4	1 19 11	26
27	46	38	52	43	2 5 5	2 0 11	27
28	47	38	53	44	2 6 7	2 2 0	28
29	48	39	54	45	2 7 8	2 2 11	29
30	48	39	54	45	2 8 10	2 4 0	30
31	49	40	55	46	2 9 11	2 5 0	31
32	50	41	56	46	2 11 0	2 5 11	32
33	51	42	57	47	2 12 3	2 7 1	33
34	52	43	58	47	2 13 7	2 8 3	34
35	53	43	58	47	2 14 11	2 9 6	35
36	54	45	59	49	2 16 5	2 10 10	36
37	55	46	60	50	2 18 0	2 12 3	37
38	56	47	61	51	2 19 7	2 13 8	38
39	58	48	62	52	3 1 3	2 15 2	39
40	59	49	63	53	3 3 0	2 16 9	40
41	60	51	64	54	3 4 9	2 18 4	41
42	62	52	65	55	3 6 6	2 19 11	42
43	63	53	66	56	3 8 3	3 1 6	43
44	65	54	68	57	3 10 2	3 3 2	44
45	66	55	69	58	3 12 2	3 5 0	45
46	67	57	70	60	3 14 5	3 7 0	46
47	69	58	72	61	3 16 9	3 9 1	47
48	70	60	73	62	3 19 4	3 11 5	48
49	72	61	75	63	4 2 3	3 14 1	49
50	74	62	77	64	4 5 6	3 17 0	50
51	76	65	79	67	4 9 1	4 0 3	51
52	79	68	81	70	4 12 10	4 3 7	52
53	81	71	83	73	4 16 11	4 7 3	53
54	84	74	86	76	5 1 2	4 11 1	54
55	87	76	89	78	5 5 10	4 15 3	55
56	89	79	91	81	5 10 10	4 19 9	56
57	92	81	94	83	5 16 2	5 4 7	57
58	96	84	98	86	6 1 10	5 9 8	58
59	99	86	101	88	6 7 7	5 14 10	59
60	103	88	105	90	6 13 2	5 19 11	60

*** *Premiums are received in Half-yearly payments for the convenience of the Assured, but in case of lapse, the full premium of the current year will be charged.*

In the event of the parties whose lives are assured returning to reside permanently in Europe, they will be reduced to the English rates from the date when their premiums first fall due after arrival.

Parties visiting England *on Furlough* or for a *temporary residence* will be required to pay the Indian premium during residence in England, without reference to the number of years the same may previously have been paid in India.

Parties assured in Company's Rupees in India, who may determine on paying their future premiums in England will be required to pay them at the fixed rate of Exchange of Two Shillings per Company's Rupee; and in the event of such assurance becoming a claim payable in England, the sum assured will be paid at the same fixed rate of Exchange of Two Shillings per Company's Rupee.

ist of Orchideous Plants Indigenous to Assam and the Neighbourin Hills of Khasya, Bootan, &c.

No.	NAMES.	Size and Colour of Flower.	Habit.
1*	Microstylis Wallichii?	Small, pea green	Ter.
2	Oberonia indifolia	Minute, yellowish	Epi.
3*	,, sp.	,, ,,	Do.
4*	Liparis sp.	Small, yellow	Do.
5	,, sp.	,, ,,	Do.
6**	,, sp.	Largish, green yellow	Ter.
7*	,, sp.	Small, deep purple	Epi.
8	Otochilus fuscus	,, yellowish brown	Do.
9	,, albus	,, ,, and white	Do.
10	Pholidota imbricata	,, white	Do.
11	,, undulata	,, ,,	Do.
12*	,, articulata	,, ,,	Do.
13*	,, sp.	,, ,, and yellow	Do.
14*	,, sp	,, ,, ,,	Do.
15	Cœlogyne flavida	,, yellow	Do.
16	,, undulata	Largish, white	Do.
17*	,, fimbriata ?	,, ,, and brown	Do.
18**	,, uniflora	,, ,, and lateritious	Do.
19	,, barbata	,, white	Do.
20*	,, precox ?	,, ,,	Ter.
21*	,, maculata	Large, white, yellow, & rose	Do.
22**	,, Wallichiana	,, and rose	Do.
23**	,, ocellata	,, pale yellow & deep orange	Do.
24*	,, Gardneriana	,, white and yell.	Epi.
25	,, cristata	,, ,, streaked with bright yellow	Ter.
26	,, sp.	Small, brown and yellow	Epi
27**	,, flava ?	Large, yell. and brown	Do.
28	,, sp.	Small, brown and yell.	Do.
29*	,, sp.	,, white & brown	Do.
30	,, sp.	,, pale yellow	Do
31**	,, sp.	,, white (pretty)	Ter.
[illegible]**	,, sp.	Largish, pale cinnamon	Epi.
33**	Bolbophyllum leopardinum	Large, yellow spotted with purple	Do.
34	,, umbellatum	Largish, dull yellow	Do.
35**	,, Khasyanum	Small, greenish	Do.
36**	,, sp.	Largish, bright yellow	Do.
37*	,, sp.	Small, white, fragrant	Do.
38*	,, sp.	,, dull purple	Do.
39*	,, sp.	,, ,,	Do.
40	,, sp.	,, ,,	Do.
41**	Cirrhopetalum sp.	Small, greenish, fragrant	Do.
42	,, sp.	,, dull purple	Do.
43*	,, sp.	Large, brown and yell.	Do.
44**	,, sp.	Largish, dull purple	Do.
45**	,, sp.	,, ,,	Do.
46*	Tricosina suavis	Large, white, purple & yellow	Do.
47*	Eria flava	Largish, dull yellow and brown	Do.
48	,, sp.	Largish, white streaked with brown	Epi.
49	,, densiflora	,, ,, tinged with yellow	Do.
50	,, ferruginea	,, ferruginous	Do.
51	,, paniculata	Small, spotted with purple	Do.
52**	,, sp.	Largish, white	Do.
53*	,, sp.	,, ,, and dull purple	Do.
54*	,, sp.	,, ,, ,,	Do.
55*	,, sp.	Minute, rosy	Do.
56	Aporum anceps	Small, white	Do.
57	,, cuspidatum	,, ,,	Do.
58	,, sp.	,, ,,	Do.
59*	,, sp ?	Largish, white, yellow, and brown	Do.
60	Dendrobium Pierardi	Large, pink and yellow	Ep
61*	,, heterocarpum,	,, yell. and brown fragrant	Do
62	,, Curysanthum	,, lively yell. and brown	Do
63*	,, Paxtoni	,, ,, ,,	Do
64*	,, sp. like do.	,, orange & brown	Do
65*	,, formosum	Very large, white and yellow, fragrant	Do
66**	,, longicornu,	Large, white and orange	Do
67	,, calceolus	Very dark yellow, rose, and purple	Do
68*	,, sulcatum,	Large, yell. and purple	Do
69	,, Jenkinsii	,, lively yellow	Do
70	,, cærulescens	,, deep lively purp.	Do
71	,, nobile	,, white rosa purp.	Do
72**	,, Gibsonii	,, yellow & brown	Do
73*	,, stuposum	Small, white	Do
74*	,, Cambridgeanum	Large, lively yellow and brown	Do
75**	,, transperens	,, deep lively purp	Do
76*	,, like do., various	,, pale rose & pur.	Do
77**	,, Devonianum	,, lilac rose & yell	Do
78**	,, Dalhousianum	,, rose, white and purple	Do
79	,, multicaule	,, white and purp.	Do
80**	,, Griffithii	,, pale yellow and orange.	Do
81**	,, Farmeri	,, lively ,, ,,	Do
82**	,, densiflorum pallid.	,, white & orange	Do
83**	,, do. roseum	,, pale rose and orange	Do
84	,, intermedium	,, pale yellow and brown	Do
85*	,, sp.	,, lively orange	Do
86*	,, sp.	,, ,, yellow and brown	Do
87**	,, sp.	,, yellow, pink, & brown	Do
88*	,, sp.	,, pink and yellow	Do
89**	Spathoglottis pubescens	Largish, yellow & purp.	Te
90	Arundina bambusifolia	Large, pale rose & lively purple yell. & br.	Do
91*	Phaius grandifolius	,, white, brown, & purple	Do
92	,, Walichii	,, ,, ,, ,,	Do
93*	,, maculata	,, ,, rosy-scented	Do
94*	,, albus	,, ,, ,, ,,	Dc
95**	Aputaria senilis	Largish, rose and green	Dc
96**	A. latifolia	?	Dc
97*	Eulophia virens	Large, green and white	D
98**	,, sp.	,, dull yellow and brown	D
99**	,, sp.	,, deep purple	D
100**	,, sp.	,, green and yell.	D
101**	,, sp.	,, purplish green	D
102	Vanda teres	Very large, rosy purple yellow and brown	E
103**	,, cristata	Largish, greenish, white, and purple	D
104**	,, multiflora	,, white and rose	D
105**	,, cœrulea	Very large, deep blue	D
106**	,, sp.	Largish, dull purple	D
107**	,, sp.	,, [illegible] & green	D
108**	,, sp.	,, yellow and br.	D
109**	Camarotis purpuria.	Small, yellow and purp.	D
110	Micropera pallida	,, pale yellow	D
111	Saccolabium micrantum	Small, rosy	E
112	,, retusum	Largish, lively spotted	L

NAMES.	Size and Colour of Flower.	Hath.
Saccolabium papillosum	Small, pale yellow and purple	Epi.
,, Calceolaro	,, yellow and br.	Do.
,, sp. like ditto	,, pale ditto & rose	Do.
,, caroifolium	,, rosy	Do.
,, dasypogon	,, green and purp.	Do.
,, appendiculatum	,, yellow	Do.
,, sp.	,, rosy and deep purple	Do.
Sarcanthus sp.	.. .. ..	Do.
,, sp.	Small, rosy	Do.
,, sp.	,, white and yell.	Do.
,, sp.	,, ,, ,,	Do.
,, sp.	,, ,, ,,	Do.
,, sp.	,, rosy red	Do.
Aerides affine	Large, rosy purple	Do.
,, odoratum	,, ,, sweet-scented	Do.
,, sp.	,, ,, ,,	Do.
,, sp.	Large, like affine, and very sweet-scented	Do.
Agrostophyllium Khasyanum	Small, white	Do.
Xiphosium acuminatum	Large, white	Do.
Acanthophippium sp.	,, dull purple	Ter.
,, sp.	,, white streaked	Do.
Cymbidium giganteum	Very large, yellow and brown	Do.
,, pendulum	Large, dull yellow and purple	Do.
,, aloifolium	,, ,, ,,	Do.
,, eburneum	Very large, white	Do.
,, inconspicuum	Small, brown	Do.
,, longipetalum	Largish, green & purple	Do.
,, cypritolium	,, ,, ,,	Do.
,, sp.	Large, fragrant yellow and white	Epi.
,, sp.	,, brownish purple	Do.
,, sp.	Very large, white	Do
,, sp.	Large, white and brown	Do.
,, sp.	,, green and dull purple	Ter.

No.	NAMES.	Size and Colour of Flour.	Habit.
146**	? Phalænopsis, sp.	Large, yellow & reddish brown	Epi.
147	Euphorboscis pygmæa	Minute, yellow	Do.
148	Geodorum dilatatum	Large, white, purple and yellow	Do.
149*	,, sp.	,, deep rosy purple and white	Do.
150**	Platanthera sp.	Large, white	Do.
151**	Peristylis sp.	Largish, white, sweet-scented	Do.
152	Habenaria hamigera?	Small, green	Do.
153	,, sp.	,, yellow	Do.
154	,, sp.	,, greenish, yellow	Do.
155*	,, sp.	,, white	Do.
156**	,, sp.	Large, white	Do.
157**	Pogonia Joliana	Small, rosy white	Do.
158**	,, sp.	Largish, green	Do.
159**	,, sp.	Small, purple	Do.
160**	Cyrtosia sp.	Largish, golden yellow	Do.
161**	Spiranthes sp.	Small, white	Do.
162**	Zeuxine sulcata	,, ,,	Do.
163**	Anæctochilus Roxburghii	,, rosy white	Do.
164**	,, sp.	,, white	Do.
165**	Cypripedium venustum	Large, green and purple	Do.
166**	,, insigne	,, red and yellow	Do.
167*	Calanthe densiflora	,, lively yellow	Do.
168**	,, sp.	Small, brown and yellow	Do.
169**	,, sp.	Large, white and green	Do.
170**	,, sp.	,, ,, and yellow	Do.
171**	,, sp.	,, dull purple	Do.
172	Goodyera sp.	Small white	Do.
173	,, sp.	,, ,,	Do.
174	,, sp.	,, ,, dull purp.	Do.
175**	Ophrys sp.	Largish, rosy purple	Do.
176**	,, sp.	,, green and purple	Do.
177**	Anthoginum sp	,, rosy	Do.
178*	Bonatea sp.	Small, green	Do.

Æschynathus (3 to 4 sp.): Hoya (5 or 6 sp.); Arum (several) Lilium (1 sp.); Nepenthes (1 sp.); Ferns and copodiums (150 to 200 sp.); Palms (Livistonia, Leoxalia, Caryota, Calamus, &c.) are also indigenous, and can sent if required.

Plants not marked are common.

Plants marked with an asterisk are considered rare.

Plants marked with two asterisks are considered very rare.

The charges for a box of 4 cubic feet measurement, containing an equal selection of the three kinds, will 5*l.* or 50 rupees, deliverable at Calcutta. When Plants which are rare or very rare are required, the charges ll be according to the kind taken; for the rare 1 Rupee 8 as a Plant; for the very rare, 2 Rupees a Plant. When ry large Plants are directed to be sent, no extra charge will be made.

When new Plants not included in the list are sent, a separate charge will be made. When two boxes or more taken, a discount of 10 per cent. will be allowed.

Plants can also be sent in glass cases, on the Wardian plan, measuring 2 feet 6 inches in length, 2 feet adth, and 2 feet 7 inches in height, for which an extra charge of 20 rupees will be made. Glass covers can also supplied for the other boxes, at an extra charge of 10 rupees.

N. B.—The proper time for sending Orchids to England is in their *dorment state*—therefore orders should sent *before* the Month of March, as the Plants after March do not bear removal. All Orders sent *after* the 31st rch will be executed *the following season* unless special directions to the contrary.

Applications to be made to

MESSRS. CHARLES CANTOR AND Co., in Calcutta.

ASSAM, *August* 1, 1852.

THE JOURNAL

OF THE

Agricultural & Horticultural Society

OF

INDIA.

On the Natural Productions of the Vale of Kashmere. By Lt. W. H. Lowther, 52nd Regt. N. I.

(Continued from page 220.)

The stream of the Jhelum is very slack in its passage through the Islamabad District, and its bed narrow and deep; grassy banks rise almost perpendicularly from the water's edge, and are luxuriantly clothed with wild Lucerne, thyme, the "forget-me-not" (*Myosotis palustris* and clover (both red and white). The river is very serpentine in its course, and its current (except where impeded by bridges, or fallen ruins) gentle, and sluggish. The temperature of the water, during the summer months, is icy beyond conception, and at the season of flood nearly every part of the lowlands is irrigated by its turbid volumes. On either bank the country is very verdant, promising to the eye, though the traveller will not stray far from his boat without discovering the "nakedness of the land"—*miles* of marsh, and *acres* of thistles! But that it was not always so will be soon discovered in the innumerable ramifications of canals, embankments, and boundary marks, which (as I before stated) intersect this now unhappy valley throughout its extent. Occasionally at some sudden bend of the snow-born Jhelum, the eye is gladdened by a far-stretching orchard of fruit trees, gay with their bright-hued load of apricots, or cherries; tall and stately is the grove in its ancient growth, but many a year has sped since the fostering hand of the cultivator exercised a watchful care over the tangled boughs; the hungry herdsman, or squalid brat of the boatman revel at will on the unguarded treasures, for there is none but a very distant owner—the Lord of Jummoo. The vast marshes which lie contiguous to the river are grazed by the royal flocks and herds during fine weather, and a rough hay crop is cut off them with the sickle, which is carefully housed in stacks for winter use. The mulberry tree occurs in great profusion, and of a large size, principally on the banks of the rivulets and other wet places. Brijbuhar, (the second place of any importance after leaving Islamabad) has some silk-works on a small scale, as I found out by seeing cocoons hawked about for sale: they appeared marvellously cheap, and of an unusual size.* Here another bridge of the local kind (before described) spans the stream. Leaving this place, nothing very remarkable is met with for a great distance. Trees become scarcer, villages dirtier, and the herbage poorer as the traveller floats downwards. On some hillocks I found *Hyoscyamus niger*, and a *Phlomis* growing in great profusion:—the seeds of the latter were ripening, but a small quantity which I gathered disappointed me by withering and proving worthless. At the solitary hut of a Fuqeer, I found the only good apricots since leaving old England: in size, colour and flavour they would have proved dangerous rivals at a grand show, and I have little doubt that my fat friend, (the Indian Monk,) had been drawn hither by their sweet temptations. As I had approached the nearest point of the mountains, I *lagooed* my boat (*á la Bengal,*) and started for them on foot, a distance of some six miles. I had not walked far however when I found the green turf degenerate into a marsh, and that again into a *jheel,* through which (being thoroughly bent on exploration) I waded *sans culottes* for an hour or more until I regained terra firma. The lower ridges, composed of barren rocks had villages in their vicinity, poor enough to all appearance, but possessing a few orchards, and beanfields, the latter crop I ascertained supplied them with a coarse flour, considered very palatable. Gourds, turnips, and greens, furnished the residue of their fare. I climbed the summit of a beautifully wooded height, and enjoyed a bird's eye view of the "Trâl" Pergunnah,—more thickly clad in foliage, and more picturesque than any spot I had seen on this side of Islamabad. I sat down on a natural terrace carpetted with wild lucerne and strawberries, and feasted my senses in this wild paradise of nature. Flowers of the gayest colours were massed in striking profusion, and the air exhaled a rich perfume of everything sweet. Hawthorns, and a variety of *Cratægus* were in new bloom, of dazzling whiteness, while in full contrast just below them, in a suit of the "heaven's own blue," grew the delicate *Delphinium Alpinum* in clusters of dozens. Tall *Scabious* (Wallich's ?) *Phlomis,* violets, &c., &c., were scattered every where. I had heard of the hop having been seen in this district by a tourist, but a diligent search both here, and every where else on my part in the tyrant's dominions, has not been rewarded by the discovery, and I am inclined to think, that one of the low creeping *Dalbergias* must have been hastily put down as the enviable plant; I think its introduction would be very easy, and attended with success: and was forcibly reminded of Kent, in some portions of my rambles, the soil and climate not excepted.

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* A quantity of eggs were hatched at Meerut in March last, but the worms all perished at an early stage, apparently from the heat of the weather.

Ventipoor, a dirty village further down the river, is ennobled by tradition, as being the ancient capital, which account is further corroborated by its massive relics of an extinct race, I mean the architectural ruins of the Pandaus: illegible Sanscrit inscriptions cover the time-blackened limestone and granite, and antique coins are continually brought to light in confirmation of the antique dynasty: I was so fortunate as to obtain *two* of these, which have been duly transmitted to the learned in such matters. The surrounding lands bear prominent evidences of having been highly cultivated to a considerable elevation above the plain.

Pampur, a large village on the right bank, is celebrated for its saffron grounds. The cultivation of this flower is carried on in nearly every part of this pergunnah, the local soil being alone found suited for the purpose; it appeared to consist of a light ferruginous clay, which is excavated, near the Jhelum, and carried to the fields by great manual labour. The bulbs are planted out in small square beds in June, weeded and freely irrigated, and the crop is collected in October: the Maharajah and his myrmidons attend the gathering, and take the *spolia opima* of the occasion. The drug is sold in the Royal Bazar, and I was informed that one rupee *per seer* was levied as export duty on the trader: it varies in price according to quality; I observed some as low as 5 rupees the *seer* of two pounds, but this was mixed with very ancient stuff, or what was often worse, with the *dried petals* of the flower. *True* saffron, *(under Royal Warrantry)* fetches from 7 to 10 Rupees *per seer*, *i. e.*, in Kashmeree coinage,—which is little more than *half* the "Company's." Steeping the article in water, previous to weighing out, is commonly practised, and which, in addition to increasing weight, injures its colouring properties irretrievably: sometimes the unwary Hindustanee merchant packs it in the damp state, and on reaching the plains discovers to his great sorrow that the precious purchase has become a mass of mouldy rubbish, *unsaleable at a pice:* this happened under my own observation!

And now I have fairly reached the capital—"The Holy city" of two thousand years, the reputed Eden of man, and the legendary seat of worldly splendour and learning when Britain produced but her naked savages;—alas! for such renown, the tide of time has long ago receded, Britain rules paramount and Kashmere's sons are savage! Long before the rude gondola carries its passenger to the eastern Venice, his eager eye catches a succession of delightful objects. First looming in the hazy fore-ground towers the lofty mount vainly called "Solomon's Throne," crowned with its Buddhist fane dating *two centuries B. C.*,—next appears the "*Hurri Parvat*," another steep hill, with its citadel overlooking the population,—and finally the symmetrical avenues of poplars, (hereafter to be described) rising from the densely planted gardens which skirt the entrance to far-famed "Sreenuggur." As it would be altogether superfluous, and indeed impertinent, to describe the various curiosities of this interesting capital, in a tour which professes to be strictly horticultural, I shall deviate as seldom as possible from my avowed object, and confine my pen almost exclusively to suitable subjects.

The Jhelum forms the centre street of this aquatic Babel, and its branches (with canals of all sizes and widths) serve as the side streets, and means of communication between the inhabitants. As I before observed, every man according to his station in life has his boat, from him of the gilt barge with its 30 oars, to him of the frail skiff with but one paddle. I was informed that the last census gave *one lakh* of boats as the total of Sreenuggur and its environs: judge then of the great demand for ash timber to propel them. What with accidents, wear and tear, breakage, &c., in the rowing paraphernalia, the consumption of this peculiar item must be greatly in excess of the supply. It had even become necessary to enact a law for the preservation of the trees, and I only succeeded in cutting a log through a formal application to the governor of a district! Deodar and pine timber are very much employed in building both houses and boats; nearly all the buildings (even the *Palace*) are wooden: in some of them we occasionally find noble specimens of the imperishable Deodar. The "great mosque," nearly 400 years old, contains some fine straight pieces, used as pillars to support the roof: they are set up in basements of black marble, which durable material they are fast resembling in hardness, and colour. There are seven principal bridges (over the main stream) many of them having shops, and stalls of ware set out upon them: two or three are strikingly aerial creations, which our tornadoes of Hindustan would soon blow to "Jericho," but here the only damage to be apprehended are during an unusually high flood. Such I was informed had occurred some years back, when these, and countless houses were swept away, to be shortly rebuilt in the ancient style. The only stone or *brick* structures I could find were pier heads of bridges, occasional mosques, and temples, and a fort: wood from its being plentiful, portable, and cheaply put together, is the material in general use. Most of the dwellings have two, and even three stories, and these are very hastily made, by driving timbers into the ground perpendicularly, at the different angles of the intended rooms. Across these, beams are nailed horizontally at intervals, and then a light flooring of poplar, or willow planks is laid across longitudinally for a flooring: the walls are framed by nailing thin boards of fir over the exterior frame-work, and plastering them with compost: light and air being admitted through carved trellises which open and shut like sash-windows. The roof is almost always gable, of thick planks, thatched with many layers of the water-proof birch bark, and the hollow portion of it is used as a loft for storing fire-wood, kitchen stuff, lumber, &c. Some of the more wealthy pundits and merchants have small gardens overhanging the quays in front of their residences: these seldom contain any thing very tasteful, or ornamental: occasionally indeed a trellis may be met with covered with a flourishing vine, or a rambling gourd, evidently cultivated for *shade*: sometimes a gay patch of double hollyhocks, or a solitary rose-bush, relieved the dingy approaches, but generally speaking the open plats are filled with graves, and weeds, or offensive rot heaps. In some of the more ruinous suburbs, I noticed highly cultivated fields of tobacco, growing down to the brink of the water, and the markets were well stored with the dried leaf, which is an article of general consumption. The trades and manufactures of Sreenuggur are neither various, or flourishing, as might be anticipated in the present state of affairs. They comprise shawl weaving, embroidering wool, dyeing, turning, gunmaking, papermaking, bookmaking, lacquered ware, hardwares, and boat-building, *all* under arbitary impost with reference to their peculiar profits, more especially *those which in any way conduce to the comforts and luxuries of European visitors!* The imports consist of hides, furs, teas, borax, *churrus,* silks, wool, woollen clothes, the precious metals and stones, assafœtida, &c. (mostly from the Ladakh frontier); the exports comprise saffron, shawls, and embroidered goods, paper, fruits (fresh), and manuscript books, silks, stuffs, lacquered wares, &c., &c., of which Gulab Singh (through secret agents) is the *sole Vendor.* The *maximum* value of shawls may be about 5,000 Rs. the pair, (such I believe are the annual tribute lot which are sent to our Queen,) and the minimum 150 Rs.: the French patterns predominate, the trade being principally carried on with that nation. The dyeing of the materials appears to be a State secret; the variety of chemical combinations in the waters of the valley no doubt lend their assistance. The embroiderers are a very numerous class, the national style of dress requiring much of this ornament; silk, or cotton braid is thus worked for the lower classes, as golden is for the higher. The fashionable garment is a loose woollen cloak, or robe, either bright green or mulberry colour, the sleeves, collar, and back thickly bespangled with a heavy pattern of this needlework. Nearly every Hindoo woman however poor, wears one of these said mulberry-hued robes, (*minus* the braid.) The smiths are the most cunning workmen I have ever met with out of England; they can turn out a Damascus blade, or a two-grooved rifle, nearly equal to the originals, and have been schooled to put on the highest prices: their forges are under espionage, and all work on hand is daily reported to the chief authority, for valuation. As might be expected in a densely populated city of *beggars*, the cheap products of the soil are in great demand, and the cultivator in constant employ. The stalls of the markets overflow with abundance of green grocery: wild fruits, as crabs, berberries, nuts, &c., &c.; garden vegetables, as turnips, cabbages, greens, gourds, cucumbers, spinach, &c., and (according to the season) grapes, cherries, apricots, apples, pears, walnuts, plums, figs, peaches, quinces, mulberries; miscellaneous esculents, as mushrooms, truffles, morels, lotus heads, and singharas; all arranged in piles of bushels, near some great thoroughfare, or what is more common, cried about afloat in an antiquated canoe. The greater portion of these dainties are grown on and around the "dul" (or lesser lake situated in the environs), and from which there are two or three direct passages by boats into the city. The chief entrance is by the "Drogshuh" canal, which is furnished with a pair of sluice gates, so arranged that during a flood, the external pressure of the water closes them fast, and prevents the river from entering and swamping the low lands. It is upon these marshy shores that most of the market gardens and orchards exist; (the walnut trees, and vines, I observed were especially fine;) but it is *on the waters* that the main culture of the *Cucurbitaceous* plants is practised. Nearly the entire area of this "dul" is overgrown with gigantic bulrushes, and lotus stems; these have in the lapse of time furnished a vast mass of light, decomposed matter, which the ingenuity of man has applied to a useful purpose, *i. e.*, to the formation of "floating gardens;" some hundreds of which may be seen moored like fairy islets, each distinguishable by the stake to which it is attached: they appear to be constructed in the following simple manner. The intending gardener with his workmen having selected a suitable bed of rotten weed, fixes his boat to the spot, and commences giving it solidity by throwing down successive layers of green rushes and slime. This operation is proceeded with until the collection will bear the weight of the party, who then take their vessel to the shore for earth; this is put down on the island in small heaps of a few pounds each; three, or four seeds of melons, or cucumbers are then inserted, and in no great time they germinate: when these curious plots are covered with rich green foliage they present a charming appearance; the wind has very little effect on their stability, its force being expended on the towering fields of aquatic jungle. Many of these locomotive *vegetaria* have settled down in decay, and this gradual obstruction of the flood has caused still larger deposits of mud and leaves, which again in a few years have become *terra firma*, promising eventually a valuable field of speculation. On a few of these drifts large trees of willow and mulberry are established, overgrown with tall vines, which have the reputation of furnishing the best grapes in the country. The oldest inhabitants of Kashmere (among them the Maharajah himself,) have noticed a visible decrease in the size of this lake, according to them it is rapidly evaporating, and in a few more years will be good rice land. I would like to see one of the modern steam pumps at work on its expanse, and a few imported engineers to manage the operations; I guess it would be more quickly dried up than the above wise heads imagine.

The saddlery, shoemaking, and other leather works of Kashmere are very superior; a vast majority of the shops appear to manufacture or deal in this branch of human wants. The hides are better tanned and more durable than those met with in the native bazaars of India, and the Kashmerees handle tools, and work with them more smartly than any people, except Europeans. They thoroughly understand ornament and finish with reference to cheapness and durability. Whether a grandee's state saddle, or a sepoy's wallet, there is the same attention to appearance and strength combined, which betokens the clever artizan. I tested the abilities of several individuals in the leather line pretty severely, with great satisfaction to myself, and credit to their exertions.

A pair of English saddle bags, which cost in London four or five guineas, were given to a man as a pattern, they were the first he had seen. In four days he dressed the hide, made up the brass work, and completed the order, (with an assistant) in my presence under a tree, and all who saw the copy preferred it to the original. I paid *seven Rupees* for the same! There is a great demand for sword-belts, pouches, &c., &c., and these are often beautifully ornamented with gilded, or enamelled leather. The shoes were pronounced by my Indian servants as the *ne plus ultra* of fashion and design! I should say that most of the hides are brought up from *our "cowkilling"* provinces, for otherwise the supply would be uncertain and precarious, depending as it would on mere *accident* alone. In the catalogue of crimes punishable by the local Hindoo code, "*hutya*" or "murder" ranks high, if the offender wilfully killed two or three men he may *(if rich)* pay for their lives *pecuniarily*, but *(rich or poor)* woe to him who dares spill the blood of a *single calf*, death and confiscation of goods, and family, would attend the rash deed!

It is not then very remarkable that forfeited 'jagheers, and refugee chiefs of the Moslem creed should be so plentiful; indeed false accusations of the above truculent nature have merged into a State policy, which for covetous wickedness strongly reminds the spectator of helpless "Naboth, and his vineyard," in the "time of old."

The utmost caution is practised by the people in reporting the death of their cattle. Should such a natural occurrence take place, the police, (or *nearest* Government officials,) are duly apprised of the important fact, (in time to witness the last struggles if possible) and the carcase is then often displayed in the fork of some conspicuous tree, there to remove by the *utmost publicity*, any suspicion or evil report which may hang over the heads of the chief inhabitant, and his neighbours; or if the demise should fortunately happen on the river banks *above* the capital, the bovine relics are hurled into the stream, and left to report themselves, both *ocularly*, and *nasally* to the acute organs of the Royal Residents in the Sher-Gurri,—the balconies of which shabby edifice overhang the stream. This little manœuvre satisfies the above potent personages that a lust for *beef* had nothing to do with the casualty. The "*Bunghys*," or "sweepers," (thorough outcasts) follow up quietly in the wake, and taking advantage of some retired rock of the bank, speedily strip off the valuable portion, which is then duly registered, and secured. There is no scarcity of goat and sheep-skins and horse-hides; but the demand is often suddenly immense: when the evil tidings arrived at the capital of reverses on the frontier, every scrap of leather in it was seized in the name of the ruler, for the transport of gunpowder (over the precipitous route to Ghilghit.) Packed in this manner it is light, imperishable, and thoroughly protected from damage by immersion, or the weather. The perfumed skins, commonly called "Russia leather" may be bought at times, but are neither common or cheap; they are not equal in appearance to those obtainable in Europe, but possess the peculiar odour in greater richness. Of their properties as a specific in repelling mildew and insects from costly bales of silk, and woollen goods, the merchants are fully aware, and employ them largely with other substances for that purpose. Central Asia is, I believe, the only oriental mart where they are met with in large quantities, their material is the hide of the horse. That they are considered costly goods is evident from the high price; and "Sâdi:" (in the "Gulistan,") in the flowering extravagance of Eastern hyperbole, says:—

> "The star Canopus shines all over the world,"
> "But the *scented leather* comes only from Yemen;"

a pretty conclusive reason for supposing it to be a strictly local production!

The paper of Kashmere is the *very best* of any non-European; it is unusually white, smooth, and of fine texture: accordingly it is in great request both in the Company's territory, and in the surrounding countries. In the Bazaars of Sreenuggur it fetches a far lower price than does the inferior article sold throughout Hindustan. A vast majority of the Kashmerees can read, and a considerable number write. The taste for literature is quite hereditary, connected indeed as its pursuit must needs be with the revival of their primitive history and downfall: the sayings, and doings of their most distinguished rulers, poets, and priests, are favourite themes of conversation and song, and the visitor is not a little startled to hear passages from "Abul Fazil," "Ayeen Akberi," or "Sâdi," quoted as indisputable authorities, in matters of discussion, by the uncouth forms of barbers and boatmen, with whom he meets at every turn of his travels! The literary taste of the masses is marvellously in contrast with the brutal tone which pervades the unpoetical mobs of our English cities, and reflects itself vividly to our admiration as the fading light of that old civilization, which is fast setting in the night of despotic darkness, as a bright constellation in a cloudy horizon. I visited two of the chief book-making establishments, and witnessed the various processes of preparation. Every thing was written with the pen, (there was *no type,*) and expert artists executed the illumination and illustration of each work, according to order. There must have been at least forty or fifty individuals engaged in transcribing, in *one* room alone; of these many were sharp lads, whose penmanship struck me as the neatest of the whole. One remarkable feature of the quaint scene, was the universal buzz of chattering which was carried on by the penmen during their operations, and which did not appear, in any way to disturb the uniformity or correctness of their labours. They laughed and gossiped as if engaged in mere manual manufacture, in truth such must be their own view of the occupation, and they must depend on the eye *alone* as infallible. Mistakes must be of very rare occurrence, for in the multiplicity of works I have perused, erasures are imperceptible, and scholastic errors almost unknown. I found this branch of trade, the only one, except shawl-weaving, in a brisk and flourishing condition. The heads of the concerns appeared very indifferent to my applications for books, and informed me that they could barely supply the demands of Hindustanee and Northern booksellers, which judging by the number of hands employed, and the resolute adherence to prices, is probably true. These "*Khush-nuweezs*" (literally *pleasing-writers*) seldom keep any large stock of ready bound volumes: they mostly receive orders, and execute them by contract: a party of six or eight workmen sit down together, and make their own arrangements to transcribe the desired tôme: we will suppose it to consist of only fifty pages; the six men apportion their shares respectively, and so it is soon ready. A few standard originals are always retained in store, (generally loose and unbound, but very carefully lettered, and numbered) to serve as orthodox copies. As I stated above, high prices are in vogue, and Company's rupees alone current in these literary repositories. For a ponderous copy of the "*Ayeen Akberi,*" strongly bound, and splendidly illuminated, (besides containing sundry illustrations) more than eighty rupees was demanded, which sum was pertinaciously adhered to; for a fine edition of the "*Shah Nameh*" more than sixty was asked, and as I did not like to go away without buying *something*, I paid one rupee and a half for the commonest kind of "*Bóstan.*" To a private individual of the city I only paid twelve rupees for a quarto work of four epic poems, with fifty coloured pictures, but he was in want of cash, and no bookseller; of course rogues are abundant in this as in every other branch of business throughout the universe. "Piracy" is not acknowledged in a copying country; but "*Privateering*" (if I may thus term it) there is in plenty, *i. e.*, the finest poems, and histories, (if found inconveniently *long*, and *laborious*) are often "*docked,*" or abridged of their fair proportions, and sold as genuine articles, which with the uninitiated in manuscript mysteries, pass current. A respectable "*Mūnshi*" was my obliging informant in these matters. The penmanship is elegant and legible, in many instances not to be distinguished from type impressions, strict uniformity being its prevailing beauty. The style of illumination is that of the early ages constantly found in ancient Catholic Missals. Gold, silver and sky-blue in elaborate profusion. The "painting" I cannot praise, it is a burlesque on the divine art, totally oriental in its *outré* character; coarse, ill-proportioned perspectives, and gaudy, the favourite subjects, as usual, love and war, in which the romantic passion figures either unnaturally, or indecently, and the pugnacious science preposterously and fabulously. There are many learned treatises to be found in the dismal alleys and purlieus, some on the Arabian system of medicine and physics, others on the statistics of this and foreign countries.

Histories, both ancient and modern, of the Valley and its boundaries, epic and complimentary poems, exaggerating the deeds of favourite sovereigns and statesmen, and musty records of the Hindoo dynasty: the chief of these latter called the "Rajah Taringani," is much quoted by our modern antiquaries.

The lacquered ware of Kashmere is among the more important of its manufactures, since the annual *entré* of British officers has been sanctioned; and encouraged by their own Government, this, and indeed nearly every other branch of art has received an impulse, which in an enlightened State, would have conferred all the solid benefits of successful ingenuity on its subjects, but the owner of the unhappy "goose" in his greed for the "golden eggs," has nearly effected its demise, and the cunning artificer is reduced to great straits in his struggle between labour and taxation: the most respectable of these men informed me that a heavy impost, equivalent to about 250 Rupees "*per Visitor's Season*," is levied on his handiwork, and as he cannot afford to entertain an establishment of journeymen, is compelled to carry on his trade (sometimes by candlelight,) with the assistance of one or two boys of his family. I look upon him as the leading man in the trade, he has great taste in arrangement, and a better idea of flower-painting than his rivals; his prices are the highest, and his reputation the greatest of all the "*Nukashees*" (as they are called), and his orders are filed in a portfolio; many of them cannot be executed for a year, or more, in consequence of his limited means. The principal articles made are writing-boxes, cigar-boxes, card-trays, vases, book-covers, caskets, and a variety of fancy goods. The *best* workmanship costs as follows, writing-box 8 rupees, cigar case 3 rupees, card-tray 7 rupees, book-boards (the pair) 4 rupees, vases 12 rupees (the pair) and caskets from 3 rupees each to 12 rupees (according to size.) The material of which they are composed is *papiér maché* moulded on wooden or earthen formers; these, when thoroughly dry, are repeatedly washed over with size, polished, and then painted with the intended colour of ground work: the article is now ready for the designer, who first traces on it the outline of ornamental scrollwork, or other pattern: after which he collects his gold paint, and other colours, filling them in with almost incredible rapidity, and truth of hand. When thoroughly dry, two, or more coats of carefully prepared copal varnish are laid on, and the work is submitted for several days to exposure in the sun. The store of finished goods is usually packed in glazed paper, and kept on airy shelves in the upper story. To *my* taste the buff ground, thickly strewed with wreaths and bouquets of rose, forget-me-not, and tulips, with gold scroll work as a border, formed the *ne plus ultra* of elegant decoration, but the manifold extravagance of European purchasers usually found vent in coats of arms, ciphers, blazonry, and mottos; and there was no small show of the prevailing *penchant* for nondescript butterflies, hydra-headed monsters, dragons, and other parti-coloured deformities, remarkable only for quantity of gold and silver leaf they consumed.

The local style seemed to consist of a gaudy ground-work, interspersed with sentences (in large Persian characters) from the "Quoran" and other books of note. Among other novelties in this line of manufacture, I noticed pistols and carbines, the stocks decorated with rich flower designs, and a dulcimer, the body of which was similarly painted, to the order of Gulab Singh and Co. Most of these workmen reside in the *dirtiest* part of *dirty* Sreenuggur; after wading through a chaos of impurity, the visitor is directed to some narrow alley, where the class is found, gregarious in lots of threes and fours; the show-room is up a very dangerous ladder, on the higher story, and the sitting-room, or manufactory, on the lower. They all receive a share, more or less, of English patronage. To some people, (those who prefer *quantity* to *quality*) cheap goods are the best, and it is to customers of this class, that the trade vend whole camel-loads of coarsely executed articles at *one-third* of the price asked for the more elaborate productions. In Hindustan, among the higher classes, this "*Nukásh*" work is highly prized; the "caskets" by the females, and the "*Qulumdāns*" or writing-boxes by the men; in the Courts of Delhi and Lucknow, they are considered fashionable furniture.

Among the social and domestic occupations of the degenerate Kashmerian, boat-rowing, fishing, and fowling hold a prominent place. Necessity is truly the only source of all this corporeal exertion, and when its objects are accomplished, this lazy race relapse into drowsy apathy; the boatman in British employ, will rather tell a string of cunning falsehoods, than carry his master an extra mile, the sleepy votary of the net and hook will rather smoke his quaint pipe under the cool mulberry tree than fish out of hours for the liberal visitor, and the sturdy pursuer of game, when *his* stomach is satisfied, cares not for that of the epicurean stranger;—such is the unkindly nature, (bred by oppression, or otherwise,) of the classes, which in "Britain's favoured isle" are oppositely laborious! Every yard of water in the valley teems with fish, narrowly restricted to three or four species; of these, the chief are two of trout, not much resembling those of Northern Europe in general appearance, but furnishing cheap and delicious fare to a distressed population. The Jhelum (from its source downwards) and most of its tributaries are wonderfully stocked. The fishery is chiefly carried on in two ways, as follows: first, by net: two stout poles, some thirty feet, or more, in length, are attached to the side of a skiff, by a rude machinery, which enables their being raised and lowered at pleasure: strong lines traverse these spars, by which a capacious, triangular net can be attached when required: the bottom part of this net is loosely gathered into a pocket, to receive any fish that may drop out of the meshes.

The anxious *piscator* steers out into the stream, and putting the bows of his rude bark against the current, lowers the net into the river; he and his assistants (usually his wife and family), slowly propel the boat forward, and occasionally the machine is lifted, and the prey "brought to bag." Second by hook: this *modus operandi* is far more primitive than the last: a good supply of red worms having been procured, the piscatory party embarks in the family skiff as before, but this time they *anchor*, or attach their craft to a pole, in some likely looking deep; the tackle is then overhauled, and consists of innumerable yards of small cord, to which stones and bricks are here and there fastened as sinkers. Short links of strong thread, each having a small hook at the end, are tied to the main line at equal intervals, to the amount sometimes of *several hundreds.* A worm is baited on, *(carefully á la Izaak Walton,)* and the clumsy paraphernalia is then "paid out" along the bottom, where it is left for some time, and occasionally examined. I observed that this rude night line committed great execution. The hooks are very original devices, made by brass wire, and not to be compared in any way with a *good English bent pin*, either for sharpness or strength! The fisheries all pay handsomely to royalty for their privileges, and woe betide any amateur angler, or poacher among its subjects, who would recreate, or profit by the plenty in store. I saw a boatman severely maltreated by a soldier for "wetting a line" without orders, and it is only those in immediate attendance on the *sahib logue* who venture on such dangerous sport. The trout being comparatively exempt from persecution, attain a large size, and are strangely omnivorous. My knights of the oar filled their baskets with such unheard of baits as mulberries, boiled greens, newspapers, &c., while I *in propriâ personâ* extracted the"large fish *á l'Anglais* with fly and minnow. I saw a trout in the market weigh twelve pounds, it would have weighed two pounds more in proper season. I caught great numbers with my own hand seven or eight pounds a piece. Only one place is prohibited to the local fisherman, *i. e.*, the reach of water between the first and second bridges at the capital, which being overlooked by palaces, temples, and holy ghats, has become imbued with the odour of sanctity. The menial boatmen are *of course* all Mahommedans: their nominal pay two Rs. eight annas a piece, I say *nominal*, as they are but the serfs of an unsparing Lord, and are made to disgorge a very high per centage of their earnings. Be it known then, uninitiated reader, that *two-thirds* of the wretched waterman's stipend are filched from him at the proper *season* by that illustrious Dogra sovereign Maharajah Gulab Singh. When the pale faces of summer visitors have disappeared, in an evil hour, the dark visage of ruthless tax-gatherers, intrude themselves on the toiler's slumbers, he feels the iron arm of his *real* master laid on his pillow, and a stern voice bids him produce the exact sum for which the public accountant has credited him!

A numerous body are the "huntsmen" and "fowlers:" the former are occasionally attached to the royal person, and either furnish game trophies for display on public occasions, or what is more common, are retained for the purpose of being *lent to influential British* travellers of rank or distinction. The inferior sportsmen usually hire one, or more of these "game finders," who although very deficient as a body in courage or skill, know the country, and can express themselves intelligibly. Their wages vary, according to their reputation, from 6 to 10 Rupees, and even more. The "fowlers" carry on their avocation in the winter only; it would have gladdened the heart of even the far-famed Col. Hawker, of wild-fowl killing ingenuity, to see the original but efficient apparatus adapted to the end: a highly wrought barrel of Brobdinagian dimensions, mounted on an uncouth swivel, in the bows of a light canoe, whose arrowy proportions a slight bungling would capsize:—the ammunition crude and savage in its apparent qualities, but deadly in its effects; the "villanous saltpetre," roughly distributed through the lumpy powder, and the missiles, composed of carefully sifted pebbles, in lieu of more costly lead (which here sells at the exorbitant rate of one company's Rupee per seer). With these aquatic cannon the myriads of wild geese and ducks frequenting the lakes are stalked, and swept, the game being disposed of in the public markets. During the summer months most of these gunners appear to pursue the employment of fishers, or rice-planters.

The chief gardens in the "Holy City" are exclusively the property of Gulab Singh: they are the Shaik Bágh, Hurree Singh Bâgh, Mooskee Bâgh, Busunt Bâgh, and Dilawur Khan Bâgh. The two first are extensive plantations of fruit-trees, situated on the right bank of the Jhelum, from which they are protected by an unsightly, but very necessary embankment. They are intersected with walks for the pleasure of pedestrians, and contain several summer residences, of extremely light and airy construction; indeed these latticed fabrics resemble at a distance huge bird-cages: a nearer inspection proves that such "temples of the winds" are too cold by half for the English occupants, who have done all they could to alter the evil, by pasting newspapers, or long cloth, over the flimsy frame-works and screens. The boundaries of these pleasure grounds, besides the bund and ditch, are usually defined by rows of tall poplar trees, generally adorned with very ancient vines, which being totally unrestrained in growth, produce very coarse sour grapes; this gothic oversight must not be attributed to ignorance, let us call it more truthfully "a sign of the times;" for how many centuries have elapsed since Sâdi wrote,

> "When the husbandman lops off the exuberant branches of the vine, it bears an increase of fruit."

The stems are often enormous, trailing in serpentine folds over and around the bund, if my memory serves me right there was one of three or four feet circumference at the root: the fruit trees, (excepting perhaps the pears and quinces,) are of the commonest description. When I reached the capital (about the beginning of June) the boughs were bowed down with embryo myriads, but a heavy rain of three days' duration marred the crop with blight and mildew, scattering them by bushels on the soil. This natural havoc appeared to benefit the residue, and in the autumn I think any reasonable gardener would have felt satisfied with the actual quantity matured. The quinces were of a rich quality, and I should say if nurtured properly, second to none in the world: the fruit itself is but little used by Asiatics as a sweatmeat, but the *seeds* are known throughout the East as "*Behee-dana*:" (literally quince-seed.) These kernels, being emulsive, are employed as a cooling medicine, by steeping them in water, which they quickly render mucilaginous. Kashmere and Kabul contribute jointly to furnish the vast annual supply which finds its way into the North-Western Provinces and Punjab.

The pears were small, and undersized, but very luscious, and juicy. The peaches, (which ripen late in autumn,) were described to me as excellent, but I left the valley too soon to be able *in propriâ personâ* to pass judgment on this and many other rosy gifts of Pomona. I forgot to mention that in these two gardens there are a few trees of "white-heart cherry," locally termed "*gilass*," very plump and sweet eating. They are highly valued, and guarded: a *perwannah* (or pass) is granted to any visitor wishing to procure two or three pounds: they are as superior to the common cherry of the orchards, as that fruit is to the hedge-sloe, and I only wonder they have not been multiplied by grafting. The common cherry alluded to is of a deep, blackish red, when quite ripe, rough, and astringent to the palate, and declared by a large majority uneatable. But these austere qualities render it particularly desirable for making that popular *liqueur*, "cherry brandy." Some I tasted was excellent, and it is a pity that some friendly visitor does not whisper to his majesty a few hints on its manufacture, as his large estates would furnish both ingredients *for nothing*, and bring him annually a few more thousand rupees to boot!

There are a few fancy parterres around the summer retreats, which are crammed with China asters, narcissus, double hollyhocks, roses, pomegranates, sweet william, *Erysimum peroffskianum*, and African marigolds; the latter gaudy and nauseous flowers prevail, because they happen to be the coarse favourites of the ruler. Every morning at sunrise a boat load is deposited at the stairs of the great temple; they are soon consumed in *odoriferous* necklaces for the Ranees, and garlands for the worshippers. I remonstrated with the gardener for consuming so much ground in the cultivation of an ill-favoured plant, and gently attempted to clear away a few yards for the admission of some choice English seeds, but the old man, after vainly dissuading me by a variety of arguments from the innovation, at last cautiously implored me, if *I* valued *his* ears, to desist: which of course I *did*. I managed to cut down the weeds between a few rows of young trees, and there sowed a great variety of European forest, vegetable, and flower seeds: which in due time germinated very fairly, but were all cropt off by stray bullocks, goats, and tattoos, which no persuasion to the "mallees" on my part could remove. These men said that they were not paid for their work, and one of them actually presented himself for remuneration of several days' labour in digging and preparing the plots! I found the royal family equally lukewarm in the matter, profitable return on outlay being always the drift of their queries; they however, graciously condescended to accept of my remaining potatoes, and these were carefully planted under my own eye near another bed of the same useful root conferred by some former traveller. There are few ornamental trees besides the poplars in these enclosures: I noticed a hedge of the Persian lilac, and a small plantation of seedling *Acacia arabica*, which the acute Gulab is endeavouring to introduce for the benefit of his gun-carriage department. I do not think he will ever succeed at such an elevation: although very widely dispersed by Dame Nature, I doubt whether this tree is indigenous to snowy countries. All the gardens in the valley are let out for the fruit season to those individuals who can afford to pay an exorbitant sum for the contract: considering the general poverty, I do not know how they can possibly realize a large amount by the retail of the produce: perhaps it is *sometimes* exported. This I know, that in 1852 (the year of my visit,) not a single *kafilah* of this description was permitted to leave the district, and the reason I heard commonly assigned, was the displeasure of Gulab Singh at certain arbitrary and wild freaks committed by two or three visitors of the preceding seasons. Besides, the helpless contractor often suffers great loss by the exactions and depredations of soldiers, and more rarely by the thoughtless appropriations of Christian strangers. The process of irrigation (which is however but little needed,) is carried on by cuts from the lakes and rivers in the low grounds, and by the weighted spar and bucket, as in Bengal, in the higher lands. Inundation, as I have before stated, is the great enemy of the husbandman in the alluvial tracts, which nothing but a scientific application of drainage and engineering can ever combat. After a sudden thaw, or an unusually heavy fall of rain, the bunded tracts appear like green islands above the water, and in these the mould becomes too saturated and humid for healthy vegetation.

The " Moonshee Bagh," is not so large as the above-mentioned gardens, but there is more irregularity and diversity of foliage to attract the inquisitive eye; it is also situated on the margin of the river, and contains two or three roomy "*barradurres*," or pleasure-seats of the usual style, the airy: there are not many fruit trees, but what are far more *ornamental*, some aged planes, coeval with the palmy days of sagacious sovereigns, two or three beautiful specimens of the "*shah toot*," or "king mulberry," (closely resembling our British species,) and an infinity of roses of all sizes, colours, and varieties. Of these I made a collection at great labour and expense, with the view of introducing them into Hindustan on my return. I selected vigorous offsets, and digging round each, (outside the roots) detached the ball from its parent soil: they were then planted out in a shady bower at a short distance off, and watered abundantly; those that did not shed their leaves, or appear to suffer by the extraction, (at least 2-3rds continued healthy,) were again transplanted singly into wicker pot-shaped baskets, previously well lined with leaves: when the soil had settled down compactly, a stong envelope of birch bark, secured with twine, was wrapped over the whole, and they were once more removed to the border, remaining sunk to the crown of the stems, until my departure, when they were taken into the light deal frame I had prepared for their deportation. A weedy nullah which during flood connects the Drogshuh canal immediately with the river, serves as a very effective drain to this place, which I look upon as the most salubrious and mosquito-less of all the suburban retreats. The land road to this, and the two above-mentioned demesnes, is by the far-famed "poplar walk," a noble promenade of green turf one mile and a quarter in length, thirty to forty feet wide, straight as an arrow, and planted on either side with an unbroken line of poplars, in the very pride of their growth, forming a picturesque avenue, only excelled by one or two in Europe. This tasteful relic of the Moslems is one of the very few objects on which care is bestowed: it is preserved solely for the recreation of Gulab and his *Amrahs*, who either ride or shoot at a mark in its pleasant shade.

A rude hedge of prickly boughs has been inserted between the intervals, and pecuniary fine is the lot of any mischievous intruder. A long line of flower borders has been commenced, which besides abstracting seriously from the turf, have a wretched effect on the grandeur of the *tout ensemble*, as nothing will grow in this leafy darkness: the *dianthus*, stocks, &c., looked more like puny weeds than show plants. The entrance of this walk commences at a bridge on the Drogshuh canal, and ends just below the "Tukhi-i-Suliman." This bare mountain affords a better panoramic view of the valley than any known locality: a very rugged, winding path leads to the summit, where stands the imperishable monument of antiquity (before alluded to), on which the winds and waters of heaven have rolled unscathingly for more than twenty centuries! From its walls the pleasures of sight are vast and varied, and the scene is unspeakably sublime in the majestic beauty of natural simplicity,—the mind is lost in the depth of admiration, and flies to poetry and thought for solace. They may lend their lustre to the enchantment below, but they cannot define the exact harmony which lingers in perspective; nor can human pencil delineate the divine reality of the original, which to behold is to be enraptured—mentally I exclaimed—

———————— "the patriarchal days"
"no longer are a pastoral fable,"

as I mused, Manfred-like, upon the abyss which overhangs that gem of the universe, "Eden-blest" Kashmere! The "bird's-eye" view on a clear summer morning reveals a prominent point in this landscape, the prevailing feature of water. I do not think I err in stating, that of the superficial area, a third part is composed of that picturesque element, and during the thaw of the snows, which cap the surrounding punjals, this proportion is greatly exceeded. The local traditions assign a diluvian origin to the entire country, and setting apart the mythological history of the great event, (which is in itself not more absurd than Deucalion's story) the explorer will find himself daily more influenced by its credibility. Nearly all eastern lands in all ages, have laid honourable claim to be considered the nursery of the human race, the primæval paradise, whence they first used to till and inherit the earth: perhaps Kashmere has equal (though *less generally known*) claims with Armenia, to the coveted title of Eden; her noble rivers, north and south, her spontaneous fruitfulness, her remote situation, and not least, *the* god-like perfection of countenance and form of her sons and daughters, all favour the allegorical narrations of a subtle priesthood. Being unschooled in geology, I was unable to apply any of its satisfactory tests to the solution of this terrestrial theory, but so much of a great and important fact is prominent to the beholder, that the *entire surface of the valley was submerged in distant ages to a very great depth.* The water mark is often plainly discernible at various elevations, particularly on the steep cliffs of the range which bounds the Wulur Lake, and on the face of the Tukht-i-Suliman; at the latter I was shown vague traces of a shore *some hundred feet* above the present high water level! The rocks, downwards from the above lake, are black with time, and the chain of frightful gorges and precipices betoken an awful convulsion of our sphere, such a one alone as could rend the boundaries of a world, and let loose the mighty reservoirs of an inland sea, by the newly-cloven outlet of a river. Such is the real outline of the Brahminical legend, and such the material evidence of the visible portion. Without further speculation, I shall leave this interesting enigma to be solved by some future geologist, who in the scientific spirit of the nineteenth century, shall wander so far on the divine errand of enlightenment. The base of the "Solomon's Throne" is thickly strewed with massive ruins of temples and tombs, many of the slabs being thickly covered with illegible Sanskrit inscriptions. Here the cheerful Iris is found of all colours, blooming fragrantly in the dust of the dead, and here may be seen many a rich bush of the famous roses, with their drooping festoons of golden-hued loveliness, consecrating, as it were, the nearly extinct Mausoleums of departed dynasties: here, too, the antiquarian, with the assistance of local guides, well read in the lore of their ancestors, may decipher the strange and eventful histories of the long past, and trace the very foundations of temples and palaces whose existence is but a speck on the page of time. This is the most ancient quarter of Sreenuggur, and I must ever regret that want of sufficient leisure prevented my becoming better acquainted with the chronicles of its existence. The "Busant Bagh" is situated on the most picturesque part of the Drogshuh canal, it is not yet completed, and at the time of my visit consisted of low, marshly plots, containing a few young grafts on artificial mounds: a necessary precaution where the water overflows to a depth of several feet: indeed during the periodical floods I often went over it in my skiff; a bund was being hastily thrown up, in the manner of all similar constructions. The great charm of these grounds consists in the number and size of ornamental trees in and around them. The planes are strikingly so, especially some three or four which overhang the bank, and overshadow an artificial platform, of a few square yards' dimensions. On this *plateau* I pitched my little tent; one of the above aged trees serving me as a cook-room, the interior was quite hollow, and had two opposite arched entrances, yet the upper limbs were as healthy and leafy as some of its younger neighbours. Occasionally the canal rose alarmingly high, almost flowing into my slight habitation, but my boats being moored alongside were all ready at an instant's warning to assist me. There was just sufficient room for self, servants, and livestock, yet to my idea it was the "*one green spot loved best*," and I always took possession of it when I returned from my rural ramble. With one hundred pounds per annum, I would have felt far richer and happier on that charming islet, than most German princes or, I think, I may say, any prince! This canal, of course, teems with fish, and it was amusing to observe when the wind shook a mulberry tree, the legions of trout that would rise to devour the falling fruit. The water is like liquid crystal, very deep, warm, and weedy: it debouches opposite the palace, and was originally intended by the Mogul emperors as a near cut to the Dul Lake, and its surrounding pleasure haunts (to which I shall presently allude). At present the chief uses to which the canal is applied, are washing, bathing, and the rearing of aquatic poultry. A weekly market for rice is held on it, and gardener's punts paddle about, vending their fruits and vegetables to the pedestrians at the various bridged thoroughfares on its banks.

Hūgel's book, among other palpable errors, insists that the Kashmerees cannot swim!!! The shameless custom of promiscuous bathing in a state of complete nudity seems to be of remote Hindoo origin: it is one of the most important rites connected with the absolving immersion at Hurdwar and many other reputed sanctuaries of our own Provinces, and here in Kashmere, (the birth-place of the all-powerful "Pandaus,") we find it the common every-day practice of conventional life, nay, more, it has been adopted almost universally by the degenerate Moslems, of whom only the more affluent can afford to frequent the *Humâms*, or hot baths, constructed in various quarters, by their more refined ancestors.—Probably this disgusting feature of Punjabee and Sikh socialism was imported from the same source. From the beginning of June to the end of August (while the sun shines) the entire Kashmeree population of both sexes, and all ages, pass the greater portion of the mid-day hours in public nakedness, the most frequented bridges, and most conspicuous bazaars being the favourite *rendezvous* of the splashers and swimmers: all business then appears to have halted, and the wild votaries of aquatic sports may be seen, like river deities of questionable attributes, pursuing each other with hoarse shouts, or leaping in daring crowds from the lesser bridges of the canal. There are floating enclosures of wood, intended as bathing screens, moored by cables to the premises of the opulent, but to all appearance they are never used except by aged or deformed people.

Poultry, as might be expected, are very plentiful, especially the water-fowl, &c. Gulab has of late years made them highly remunerative. Exactly opposite the palace windows the royal barges are moored; this landing place is at the mouth of the canal (lately alluded to), and has been chosen for the convenience of ingress and egress from the Jhelum, by the same reason it has been selected as the home of geese and ducks: these birds number many hundreds, and are under the careful surveillance of the boatmen, who watch them while feeding in the floating weeds, and drive them into their pens at sunset. As a check on misappropriation, the bodies of such as may die, are suspended on a frame, "aloft in mid air," for the satisfaction of their master, and counted out to him *in person,* whenever he may require it! All losses and accidents are made good by the anxious custodians, who do not scruple on these emergencies to rob their neighbours, as I ascertained, heavily to my cost. Quantities of these birds are sent down annually to the Punjaub, and not a few are retailed to hungry visitors, the price of the ducks varying from 4 to 6 per company's rupee. Immediately in rear of this feathery speculation, stands the Dogra piggery, a large shed on a mound, with an upper story for the use of the porcine guardians, who, *bâton* in hand, watch the slumbers of the herd. From sunrise till sunset these destructive quadrupeds (numbering about 100,) have the run of the surrounding cultivation, and acres of prostrate barley stalks, or damaged peas, testify the extent of their depredations: in good truth they thrive without any expense to the monster monopolist, and, as I was informed, furnish a cheap substitute for the *fatted calf,* at his *bon jour* banquets. The groves of mulberry trees are among the chief attractions of the country: they are very extensive, and with the willow, constitute the woody aspect of the champagne portion: starvation, would be the lot of many a family, but for this panacea of the destitute: the quantity of the berry produced by one tree is almost incredible: the season commences early in June and lasts till nearly September, a succession of fruit loading the branches, and furnishing a sweet, wholesome fare for *whole months*: troops of ragged, but rosy children may then be seen, climbing like monkeys among the green boughs, while their more sedate parents are busily collecting the purple mass, on outspread garments, equally tattered, and filthy in their quality: cakes are prepared by squeezing out the juice, and drying the residue in the sun, or the mulberries are preserved entire, by gradually exposing them in the same way. This stock is carefully reserved for winter use, and usually *hidden,* to be secure from the spoliation of tax-gatherers,, in the inclement season of ice and snow, when not even a *weed* is to be had.

The unflinching hand of oriental despotism is figuratively described by my favourite poet Sadi, whose apt illustrations I must now apologize for thrice quoting. The oppressor's hireling says to the poor man—

> ———————— " Pay the land rent,"
> " Or expose thy vitals to the beak of the crow,"

a threat literally and remorselessly executed in this land of plenty!

The surface of the soil in these groves during summer, is black with berries, and great is the multitude of devourers, numbering nearly every bird, beast, and fish of the locality: herds and flocks, horned cattle, horses, goats, sheep, and swine, bears in troops, poultry, dogs, every wild and domestic bird, trout, insects, and nearly every living thing, feast indiscriminately on this manna-like gift, and attain a degree of fatness peculiar to such saccharine *pabulum*. Strong spirits are distilled from them, possessing the odour of brandy, and I remember, during an inundation, the vinous fumes which were exhaled from a morass; its colour and odour resembled a distiller's wash, caused by some hundred pounds of fermenting fruit, which were lying there under a hot sun. The Dillawur Khan Bagh is the "Cockney" villa of the capital, and is located in the midst of smoke and dirt, the dwelling-house in the prevailing fashion of lattice-work, but roomy and substantial: it has always borne an agueish character, and as for musquitoes, like more serious annoyances, "they come not as single spies, but in battalions;" and small wonder at these two plagues, for the back part of the foundation stands *in* the waters of the Dul Lake, and tall flags flourish about it; besides all this a sluggish canal bounds the front, and a low, crowded garden completes the miasm. There is a handsome vinery, well cared for, and supported on solid timber wood-works: and there are various fine fruit trees, also a still-house, where rose-water is prepared for the inmates of the royal harem. These premises abut on the rustiest portion of the town, hence the land approach renders it the least desirable of all European quarters. The "cleanliness" of the multitude is quite as low in the scale of humanity as their "godliness," alas! for the unromantic truth of my asertion, but "pity 'tis, 'tis true,"——mind, and body are alike defiled by evil association.

The population of Sreenuggur is visibly decreasing, and at the period I visited it certainly could not exceed fifty thousand, of these more than one half appear to be Hindoos of the holy class. Of course in the above calculation I do not include the troops, whose presence and number depends on the tide of public events. They are two-thirds Dogra (the same military caste as their master,) and there are always a few companies of Hindustanees, for *rough* work. The soldiers are mostly quartered in the " Sher Gurri" and " Hurri Purbut," the only attempts at fortification in the place. The men are wretchedly fed and cared for, but they are supposed to fill their stomachs by foraging on the inhabitants, dreadful is the scene of violence in consequence. This marauding is always confined to the property of the Mussulman subject, and no cognizance is taken by the Government of any robberies perpetrated in their houses. The civil employés of the Tyrant are all either Pundit, or Dogra;—they all *nominally* receive very low salaries, but it is understood that no cognizance will be taken of moderate imposition,—or indeed of any injustice which does not affect the prompt payment of the revenue. Some of the Pergunnahs are farmed (like those in Oude) by Pundit leases, and a few of the most productive and populous are reserved as crown lands, under the " cat-like watch" of the lion himself, or his Dogra representatives. The crops are very limited in variety, rice (in the marshy lands) maize, beans, peas, barley, hog-grass, and mustard (for the oil), complete the amount. The *nominal* tax on the produce is *one-half*, collected at harvest time by deputies, who affix the " Thapa," or royal mark, to each heap of grain. But this is not all the persecuted farmer has to pay, he is further " dunned" for fees, gratuities, and considerations, which eventually leave him with often *not one-third* of his labours' fruits ? It may be easily imagined how such an iniquitous mode of collection has devastated the local agriculture—in five more such years the vale ought to be a complete wilderness—and indeed a vast tract of the western portion is so already; besides these arbitrary institutes, Gulab has carried his cold-hearted imposts to the verge of ultra-barbarism;—yes, he has set a price on marriage and national increase! It is no less inhuman than untrue, that he has levied a perquisite on these natural necessities, amounting in the more impoverished districts to a positive prohibition, for I was informed by the patriarch of one village that no espousals had occurred for two long years, and who can doubt that it has not caused infanticide. The name of the barbarians Gulab Singh and Titus Vespasian will go down together in history as the occupants of *wretched* royalty. With the former the sordid feeling reigns degradingly—

"Odor nummi suavis est.

Only the followers of Mahomet are subjected to this Malthusian indignity, the Hindoos are free to their customs, and they walk abroad with their sleek wives and comely families, unnumbered and unmolested.

The exact amount of a revenue depending so completely on the caprices of a hard taskmaster is difficult matter of computation, one thing is certain, that it is *annually diminishing:* true, that he makes a few thousand rupees per annum by his white guests, and equally true that he nets a few hundred thousands by his export trade, still his local means of "raising the wind," are fast failing, by a large proportion of his *quondam* tenants having turned fugitives, and deserted him. Of the 80 lakhs which he paid to our politicals as the price of his sovereignty, he has frequently boasted that he retrieved the total by *good management* within the first three years; this must have been sharp work in a country already bleeding under the successive inroads of the Mogul and Sikh. The kingdom of Jummoo comprises the rather barren hills of that Dogra principality:—the Pathan highlands towards Mozufferabad, equally bare and scantily peopled; Little Thibet with Ladakh and Iskardu, only rich in mineral wealth, and valuable as the marts of Chinese produce; and last not least, the world-coveted, and heaven-endowed, Vale of Kashmere—

"Where all but the nature of Man is divine."

But enough of sober statistics. I must hasten to complete the catalogue of my rambles, by leaving the noisy environs of the "holy city," and visiting the distant shades of those fairy-like paradises, which reflect themselves on the bosom of the further lake. Strange is the scene as the skiff slides through the indefinite lagoons, overgrown with the princely lotus, the waving bullrush, or the tangled* *Singhara.* Busy kingfishers, greedy gulls, and half-fledged wild-fowl are almost the only living things to be found, barring ourselves and the boatmen. In the olden time when the nobles of the Punjaub were in the zenith of their ostentation, it was the prevailing fashion to wear a sable plume composed of certain graceful feathers obtainable only from the tail of an aquatic bird called here "*Hooma,*" but known to Europeans in our provinces as the "water pheasant." They commanded a high price, as it was necessary to catch a great number before sufficient materials could be found for one of these ornaments. With the conquest of the Khalsa has almost expired this very graceful appendage of the head-dress, which is only now to be met with in the collections of the curious, consequently these creatures are now very common, and I saw no one in pursuit of them. The Dul Lake has been divided by time into several parts, which have distinct names: many grassy islets present themselves, and the ruins of a stupendous causeway here and there rise above the water, appearing to extend from Sreenuggur to the *Nishâd Bâgh,* or "Garden of Bliss," and having the credit attached to them of being the work of a wealthy pundit. Sometimes the inferior ridges of black sandstone jut boldly into the lake, and give it a dark hue, and sometimes the green fields and orchards slope to the very brink of the water, and confer on it a very gay tinge, which magical effects considerably heighten the romantic character of the scenery. I found the above high-sounding retreat in pretty good order, considering the

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* *Water Caltrops.*

"bad times"; it is entered by stairs, which rise from the lake, is full of small ornamental buildings, has avenues and fountains in abundance, and a great number of fruit trees: but, excepting potatoes and "white heart" cherries, I did not find much horticultural novelty: there were a few parterres of very common flowers, and the usual decoration of plane trees. A few hundred yards off, in a walled enclosure, stands a large summer-house called the "*Chusmah Sahi,*" (literally "royal spring"), its luxurious appurtenances of conduits and reservoirs are choked up with rubbish. the edifice itself being used as a *threshing-floor*. A number of large walnut and other fruit trees surround the spot, which seems to have been originally intended for keeping up a head of water to feed the fountains of the *Nishâd.* On the hillocks of waste ground in the vicinity I saw some of the finest specimens of the yellow rose. An unfinished building of considerable extent adorns the bleak ridge beyond, known as the "*Peri Mahul,*" or "Fairy Palace," commonly ascribed to the "Light of the Harem," Noor Jehan, and surrounded by the tasteful outlines of terraced grounds. Around the shores of this lake are hamlet and home-stalls in close proximity, embosomed in dense groves of walnut or mulberry trees: rice fields, too, encircle the foreground with their verdant growth, and furnish the eye with a smooth plain whereon to repose, after scanning the illimitable gorges which extend for whole leagues at its right hand. Passing through the broken causeway above alluded to, a few minutes' labour at the oar carries the traveller's boat to the main attraction of the season, the renowned "Shalimar" of the world-subduing Jehangir. Every thing is on a larger and more magnificent scale than in the grounds lately described, but of course the penurious system of its modern master will not admit of much outlay, and his care of the establishment is confined to petty repairs at uncertain periods: occasionally the fountains (some *hundred* in number) are permitted to play, (the spectator being expected to pay the labourers on the occasion), and some few boatloads of lime and stone have been lately lavished on the ancient masonry, which is very dilapidated. The soil is very low and marshy; indeed the centre avenue is a *broad canal,* (choked with weeds, and rubbish, which barely admit the passage of a light skiff,) beautifully edged with giant planes. The "corn-flag," or "yellow iris," is at present almost the only tenant of the much-neglected plots. I fancied I saw a specimen of the European laburnum, but as its blossoms were withered and discoloured, I could not be *quite* sure of the fact. There were innumerable trees of the local fruits, and some bushes of "Syringa Persica." Among a variety of structures, all seemingly in the Arabesque, or Moorish style, is an inferior one, which from its quiet grandeur is a general favourite: it is an alcove supported on massive pillars of black marble, and surrounded by water-works, and *jets d'eau,* which, when in full play, have a brilliant effect from the interior. In the middle of this division of the Lake lies the pretty islet of "*Char Chunar,*" or the "four planes," (of which two have vanished,) and now in complete ruins, despite its poetical celebrity. No great distance off stands, perhaps, the finest artificial forest in Asia, the "*Nazim Bagh,*" or "Healthful Garden," containing, in regular rows, nearly 1,200 plane trees of *two centuries* growth! In the vicinity are many interesting objects of research which I have not space to notice. There are two distinct routes by water leading to the "Wulur Lake," and western districts of Kashmere, one by the very wild and savannah-like outlets of the "Dul," the other by following the main stream of the Jhelum, through the seven bridges of Sreenuggur. For many long miles on either bank there is nothing worthy of admiration or notice, the country is a complete morass, dotted with temporary colonies of semi-aquatic islanders, who in their boats appear to carry on the rude crafts of fowling, fishing, mat-making, and grass-cutting: indeed the latter occupation seems to be dictated by the government, who employ regular superintendents for collecting the winter provender. I noticed large stacks of the dried rush and water grasses which had been formed on the more elevated grounds. *Occasionally* fine lofty trees are met with, (especially the favourite planes,) but otherwise the want of foliage becomes strikingly severe. On the downward trip, Shadipoor is the first approximation to a village met with: dirty, poor, and scarcely cultivated, yet Abul Fazil calls it a *city,* and one of very old origin. Grazing seems the main employment of the peasants, who vend curds, milk, fowls, sheep, and kids to passengers: it has also a few weaving looms (or rather *dens.*) Across the river, close to its junction with a streamlet called the "Siund," are many extensive orchards and enclosures, beyond which is another royal demesne, called the "*Surooj Bagh,*" in the usual disorder of the others. The next place of any note is Sumbul, a considerable town, connected by the bridge thrown across the Jhelum: very populous and therefore *very dirty.* The best mulberries I ever met with were gathered from a grove of aged trees in the outskirts. A respectable faqueer has adorned an approach to the bridge with beds of flowers, among them was a lovely group of the "drooping lily" (*gool-zumbac*) whence he supplied me with a liberal quantity of tubers. The fish swarm in myriads round the sunken timber of the arches, and my crew made a goodly haul of them. There is a small lagoon further down the stream, near Sofapoor, once a place of fashionable resort in the days of Muhammedan supremacy; the "Light of the World" is said to have made a garden there, of which small traces now remain. The contrast of sedgy shores and bold mountains, to my idea, produces a very *hybrid* cast of picture, which it requires time to harmonize. I had heard much of the *gūl-margh,* or "village of roses," during my stay at the capital, and naturally felt very desirous to visit it. I had now arrived at the nearest point to that oft belauded locality, and ordered my passage-boat to steer in shore : it was a task of more than ordinary exertions, to push through the matted jungles of reed and bullrush : the oar was altogether abandoned, and we had to unite the common stock of strength in making a narrow line for our craft : the mosquitoes attacked us vigorously during the operation, not like the *timid* Bengallee gnats in trios, or quartos, *occassionally*, but in dense clouds of thousands, which did not easily retreat before the smoke of a large fire in our prow. With swollen limbs, and itching face, I made the best of my way across the wet meadows to Pulhalum, one of several pleasant villages situated in a wood of walnuts. The whole face of the country inland consisted of lovely valleys, lying between sloping hills, whose verdant undulations reminded me forcibly of pleasant Kent and its rural comeliness, yet population there was none, a few barely clad rustics were met with during the long journey of fifteen miles, and many of the rude cottages were tenantless; I could scarcely obtain two coolies to carry my portable wants. I gathered *en route* a great variety of flowers, and a few seeds: among the former, "striped *dianthus*," roses (various), *digitalis*, balsams, many flowering grasses, *prunus*, &c.; but it was not till the latter part of the march that I began to perceive the productive features of the district. The rugged thoroughfare entered a thorny brake, containing a vast wild forest of apple, pear, and apricot. I was amazed at the quantity of fruit, it was ripening there in *tons*, with no body but the bears to eat it. The apples were better to the eye than the palate, but I think would have made good cider. I was told that this pergunnah was once exceedingly rich and prosperous: so it would seem, for these trees could be hardly self sown. A forest of pines and firs clothes the abrupt mountain ridges over which the road climbs: this road is wonderfully smooth, even for such a position, and was constructed at vast amount of labour by some enthusiastic admirer of grand scenery, (some say, Akbar). There are numerous springs of delicious water at intervals, and so dense is the shade that sunshine seldom enters. I felt a thrill of admiration, such as I had never yet before known, ere I had reached the place of my encampment, the lone *ziarut* of "Bassam Rishi," where I found a hearty welcome from the monastic community of faqueers who are attached to the shrine: they appeared well supplied with provisions, the long winter rendering it necessary to provide for such snow-bound seclusion, by laying up an abundance then of necessaries. This tomb is visited annually (like many others) by devotees from all parts, and their offerings constitute the sole income of the guardians. A few acres of untilled land surround the premises, which are compactly constructed of fir timber, and very "Swiss" in character. As this is the nearest habitation to the *gul margh,* every body makes it their *point d' appui,* whence an easy and level ascent of about 2 miles is quickly accomplished: no tongue can describe or pen delineate the charms of this retired region. First, the fine smooth thoroughfare winds through lofty forests of ancient trees, comprising fir, yew, box, ash, birch, elm, and a multitude of others, their undergrowth chequered with showy clumps of *anemone,* meadow geranium, *potentilla, gentian, aconite,* &c.; then it scales the Arcadian verdure of contiguous knolls, tufted with *azaleas,* flowering grasses, and lilies, and lastly with captivating celerity, bursts on the vista of an Alpine glen, fraught with the summer hues of Flora's wildest favourites! The rich turf is everywhere spangled to satiety with gay masses of *auricula, gentian, primula,* and the "drooping lily," which latter by its weedy superabundance completely perfumes the air. The elevation is stated to be 4000 feet higher than that of Kashmere; however that may be, there is a wonderful view of the plains below, and of the main peaks in Huzareh. At such an altitude, rain and snow in their respective seasons are almost of daily occurrence. This natural park may be a mile or two in length, of very serpentine shape, and no where more than 200 yards in breadth; dense forests rising perpendicularly from its sides, and a streamlet of icy temperature murmuring cheerfully throughout. It should be seen immediately after the thaw, that being the vernal period of its flaming attractions, just then bursting into bloom. So soon as the snow has disappeared these elegant pastures are grazed by immense herds of cattle, which indeed appeared to be the sole animal tenants of these remote uplands: the cowherds locate themselves in sheds of rough construction, remaining together during the fine weather. The quantity of strawberries produced here furnish an inexhaustible *bonne bouche* to European tourists, with whom this place is deservedly a favourite resort. During the year of my sojourn in Kashmere, the Resident and a number of visitors betook themselves to its healthful shades, dwelling there for a long period under canvass.

But there is a melancholy silence attached to this secluded nook, which not even a misanthropic spirit could endure for any length of time. The voice of nature is seldom heard, except when she rages in the thunder, or crushes with the avalanche: no birds of cheerful song or busy habits soothe the ear, amuse the eye, as in our European woodlands; no—all, but the hoary vegetation, or fleeting blossoms, has the stern sublimity of an unknown world, too grand for mortal wants. I found myself again on the Wulur Lake for the *second* time during my Kashmerian tour. When I first entered its broad expanse, the waters were nearly at their height, fraught with the combined contributions of the Jhelum and a host of minor rivers: it was then an inland sea, (comparatively speaking) with the mountain chain as its boundaries, *now* it was merely an aggregate of marsh and meer of about half the original volume. On its shores lie a number of considerable towns and villages, more or less populous in their season. Except in the immediate neighbourhood of these settlements, there is a great paucity of trees: fine stately orchards of mulberry are met with in profusion close to the larger habitations, but otherwise the scene is very bare of these principal appendages. Bold promontories and craggy precipices rise uncouthly from the deep blue waters without a single leaf to relieve their colossal outline. There are but few exceptions to this hard feature of the view, and those are of course purely artificial: among them the "*Lunk*" Island, an isolated rock, which from time immemorial has been sanctified alike by Moslem and Hindu, who have bestowed an artificial soil on the sandstone. Smaller specimens of the same zeal are also met with in various spots, the earth having been brought by great manual labour in boats from the main land. The lake is generally very deep, and (excepting under the mountains), very weedy. I pulled up stalks more than 20 feet in length, and was assured by my rowers that the clear portion is more than three times that amount. The cultivation of rice, and the "*Singhara*" is the main occupation of the people who live hereabouts, large *floating colonies* are met with, of heavy boats moored together *en masse*, the crews being engaged in the latter branch of husbandry. This nut is a highly profitable source of revenue to the government, who have a regularly organized establishment cruising on the spot for its maintenance and supervision. Being an eminently nutritive, and therefore much sought article of food, the returns on it are enormous; more than a lakh of rupees *Company's rate* are annually realized by its sale. I shall not stop to describe the surrounding country, which in the richness of its scenery vies with most other portions in natural magnificence and mournful desolation, but shall pass on to Sopur, where the Jhelum quits the Lake in rather boisterous currents. A lengthy bridge unites both banks, on which are situated a fort, military establishment, and the two portions of a large straggling town, more populous than usual. I did not find much to interest me here, but had the satisfaction of witnessing a north-wester, which rendered the Wulur Lake a little ocean, torn up with rolling waves: these, as I expected, proved too much for many of the clumsy vessels on its bosom, and they foundered. My own boats in attempting to shoot an arch were completely *unmatted,* and thrown on their beam ends, amid the shrieks, prayers, and vows of the bewildered *oars-men* and *oars-women,* who thought it no reproach to jump on *terra firmâ,* and seek safety in a mosque! Verily any other nation in our world, but the miserable, soul-jaded Kashmerees, would sooner have risen in a struggle for freedom against such inhuman tyrants as they have endured for the past half century: but courage they have none, a fact which only renders their position more wretched, in increasing the despot's cruelties, and encouraging him to commit them without the common fear of retribution. Even suicide is practised as the last resource of evading them, for no one dreams of physical combat or resistance. Gulab Singh may well call this degenerate people, *brutes,* in excusing himself to our politicals, for their maltreatment! From Sopur to Baramula the river attains a considerable size, being seldom less than two or three hundred yards wide, and the current becomes less slack from its *debouchement* at the former place to the rocks at the latter, below which unnavigable rapids lead into boiling cataracts, caused by the narrowness of the gorge, and the sudden descent of elevation. The distance between the two towns I accomplished by boat in a few hours, observing nothing very remarkable *en route*: bare hills, with the low marshy meadow tract below, constituted as usual the aspect of the districts. Near two or three small villages I noticed some large flocks of sheep, kept for the sole purpose of growing the wool, of which the cheap stuffs and common fabrics in general use are made. Baramula is the main military post of the valley, the master-key of its treasures, consequently barracks, and troops, and fortifications, and all other strategical precautions are fully displayed to the stranger. I may almost call the position impregnable; nature has omitted very little in rendering it externally inaccessible, and *that little* man has completed. None but the the active mountaineers of Nepal or the Hazareh would have any chance of forcing the approaches, which are the most precipitous conceivable. The houses of this very rural town straggle to a great extent along both banks of the river, the inhabitants holding communication by a bridge (the last in Kashmere) and ferry boats. There is but little vegetation in the immediate vicinity, the mountains near the stream being quite bare, but I found in the damp crevices a few *Salvias, Iris,* and *Narcissus.* Here I quitted the "Vale of Vales," of which this is the Western limit, and bethought me, as I departed, of the well-deserved eulogium,

> "If there be a Paradise upon earth,"
> "It is this,—it is this,—it is this!"

There is scarcely a vestige of any road to be found. Often the traveller has to dismount from his pony at some abrupt corner, where the giddy footing is suspended several hundred feet above the foaming Jhelum. There is very little to interest him in the scraggy vegetation surrounding the pathway. The first object of attraction is the hanging bridge of Uri, (the second stage), composed of leather ropes, stretched across the river, and attached to strong posts fixed in the solid rock. At short intervals these ropes are connected with smaller ones, to serve as a balustrade.* It requires the nerves of a Highlander to tread this slack invention with any degree of safety—or possibly a British seaman might swing there with folded arms unconcernedly in the spray, but to me and many others nothing less than the excitement of escape from a desperate enemy would tempt the venture. The cables sway to and fro most alarmingly when the passenger is about half over, and nothing but *sang froid* can save him from destruction. The view of the gorge from the cliffs is very imposing, quite *satanic*, in the over-powering majesty of its sombre terrors, and the eye involuntarily embraces the mundane catastrophe which rent this yawning chasm.

A small fort surmounts one of the strongest heights, apparently garrisoned for the sole purpose of collecting the revenue: there is a great deal of tillage, rice and maize being the chief crops. I saw the nearly extinct remains of very interesting ruins connected with Buddhism, and also those of a massive bridge, which a century or two ago spanned the furious river. The next march was beautifully wooded, the *road* (if it may be honoured with such a civilised name) ran parallel with the torrent: noble trees were being felled, and launched into the gulf. I sat down and watched their gyrations and vicissitudes: most of them shot downwards with the velocity of sticks, a few became irretrievably jammed between sub-aqueous boulders, and more rarely, some were smashed like straws in their headlong career, becoming mere food for fuel. Their destination was Jhelum and the contiguous ferries, and I was informed that the floatage down this and the other rivers of the Punjab, is so precarious, and fraught with disaster, that one-third of the original stock alone can be reckoned upon, which however gives very fair remuneration. Besides the natural difficulties of the stream, we must take into account the purloining propensities of the villagers in places destitute of firewood, an evil which entails considerable deduction of itself, and for which there is no economical remedy, until the logs have found their way into sufficiently smooth water for the construction of rafts. During this and the past stage the grape vine in its wild state composed the undergrowth of the jungle; sometimes indeed it attained a size seldom found in gardens: the fruit as might be expected, was numerous, but very tart and rough; no doubt it would have made a good wine. I also found the common nut *(Corylus)* in great abundance. Flowers were scarce, the principal being clematis, and two or three of the more common "*Orchidæ.*" The "*kustoorah*" or "mountain blackbird," (not much unlike the British species) appeared very common, and warbled sweetly in the bushes. In Kashmere (where they are much prized) I had seen twenty rupees (Company's) refused for one. There is a cross-path, which leads away to the new sanatarium of Murree, described as incredibly difficult and dangerous, but there is now so much thoroughfare in that direction, that I have little doubt the English portion of the same, has been long ago made straight, —*malgré,* whatever Gulab may have left undone in *his* department. The track which leads to Poonch is the one I followed: nothing but the sublimest scenery which our world can afford, would ever tempt me to follow my old footsteps in this direction. The damages and difficulties attending my heavily loaded mules and coolies were numerous, and disheartening: sometimes a passage of a *few feet* between towering rocks would occur, and here it was unavoidably necessary to *unload,* pass through, and then *reload*; or a perpendicular flight of sandstone rocks would call for the united energies of all the *bipeds* to assist the breathless quadrupeds over them, or what was often *worse,* some luckless mule would descend head foremost into the perilous slopes of a "cloud capt" mountain, and so on, until every body and every thing were exhausted. Nevertheless, I passed in safety over Pir Hadjee (a spur of the Punjâl) fervently admiring the manifold beauties of this route. Every thing had a charm, not the less enhanced by the labour which had enabled me to view it: the altitude of elevation above the sea, could not have been *less* than 15 or 16,000 feet, perhaps *more.* The profusion of moss in the damp woods was astonishing; for whole miles the bottoms were covered with it, and on the sunny slopes were flowers in thorough luxuriance. The "Drooping lily" was still met with more numerous than ever in large tufts, and of taller growth than hitherto; also everywhere, *Meadow geranium, Primula, Orchids, Viola, Anemone, Potentilla, lavender, Scabius, Phlomis,* and a *Thistle* like plant, with showy blossoms of a rosy white. I saw *Azaleas* and other *Alpine shrubs* on the table land near the summit, and on my descent observed the elm, box, holly, and other European trees, in the greatest abundance. The only birds appeared to be the raven, magpie, tomtit and pheasants. There is a very rapid incline to the Poonch valley, which is completely intersected with petty rivers and rivulets in every direction. These form the most serious impediment to travelling at particular seasons, as I found at the expense of my baggage, which was constantly immersed by accidents. The rice lands are very extensive, and at times present the appearance of a general inundation: the highlands seem to be but thinly populated, and little cared for: they are overgrown with coarse grass and tangled creepers, trees being somewhat scarce. Poonch is the capital, and residence of the Rajah Jowahir Singh, (Gulab's nephew) by all accounts the "Hotspur" of the family. His Jagheer is said to be worth five lacs of rupees, held on the tenure of military service; but it is far more probable that his sword will be drawn *against* his uncle's successors, rather than *for* them. He is a good landlord, idolized by his troops, and said to be of a very martial, independent spirit. At the time of my *entrée* he had some serious differences with his kinsman, and the followers were all drawn out in full array to repel an expected invasion. My sudden appearance on the distant hills brought out an advanced guard, whose flashing weapons betokened warlike preparation. I met with so much insolence and incivility here from the excited warriors, that I was glad, even in the midst of heavy rains, to make an onward start. But it was no easy matter to proceed: the torrents (always dangerous) were now altogether impassable, and it was hinted by my guides, that I should be compelled to *bridge* one or more of them, if I valued the safety of my baggage; accordingly, I had not progressed some four or five miles, when I found that I should really have no other alternative (except marching back) in the present swollen state of the waters. A great number of labourers were collected by my servant, and by dint of sharp axes, and willing hands, trees were felled, thrown across, and a passage effected without accident before noon; my mules and horses being driven through the boisterous waves, and gaining the opposite rocks under the guidance of ropes. The sides of the mountains are occasionally dotted with hamlets, whose inmates appear to cultivate only just sufficient maize or rice for household consumption. I found these people more industrious, more manly, and more contented than any peasants I had yet seen since quitting the Company's territory. The country is the most savage imaginable, the forrests and brakes being in a totally undisturbed state, tall *null*-grass and the dog-rose *fill* up the narrow intervals between the trees, and afford an impenetrable thicket, infested by those nocturnal marauders on agriculture, the black bears. These animals were the pest of the husbandman in this district, his labours, when the heads of maize attain bulk, must be bold and unceasing, or he will lose the winter food of his family: in these vigilant watches he has constant encounters with stubborn bruin, who cares very little for the few blows he may receive from a common cudgel; on the other hand, the half-naked watchman is sure to be severely handled in defence of his property. No firearms or swords are allowed to be carried by the rustic colonists, so that these men often perish, and become irrecoverably maimed in the unequal conflict. No less than five men had been lately killed and wounded in a small woody tract, overlooking some fine patches of cultivation, and the evil by all accounts was daily increasing. The heat of this very confined valley is too great to tempt British sportsmen into its wildernesses for any length of time, so that nothing but an occasional shot from a straggling soldier's matchlock is ever heard. The *balsams* were growing everywhere in beautiful luxuriance, and with the "*Gloriosa lily*" constituted the sole flora of these jungles. I saw a solitary specimen of *Aristolochia*, with a dark lilac flower, several creepers (comprising *bindweeds*, and *leguminosæ)*, and passed through many considerable patches of *Berberis aristata.* I discovered a large species of *Urtica*, very venomous in its powers of stinging. I had ridden into a shady group of tall trees, without observing that the under-growth was composed of these hostile plants: the plunging of my horse soon attracted attention, but not before my hands, and arms were severely tumefied, did I succeed in ascertaining the true cause. I found common cotton garments no proof against these disagreeable weeds, and in spite of every precaution, I daily suffered much bodily inconvenience from their existence. I did not here observe the common nettle (*Urtica dioica)*, though it is very prevalent in all the hills, through which I had yet passed, and is called "*bichee*" (or the "scorpion") by the natives. In a boggy rivulet, I found "common watercress," (*Nasturtium officinale)* the sole instance of my meeting with this aquatic herb, throughout the entire tour. One of the prevailing trees is the wild olive, which will without doubt, in no distant times, be engrafted with the choice European variety. I had quitted the main highway leading, viâ Kōtlee, to the Punjab, preferring to see the more secluded portions of the country.

As the rains rather *increased* than *decreased,* I was not sorry to avail myself of the hospitality offered by a respectable Rajpoot zumeendar, (who held land under the usual feudal tenure), and I did not regret this opportunity of social intercourse with the generally reserved Hindoo. I fancied myself in a snug homestall of the Scottish highlands, and barring the *colour* of my host, and his family, the *height* of his crops, (all *maize)* the resemblance was otherwise perfect. There were the cakes on the hearth, the *gude* young housewife spinning and churning, the master looking to his calves and young stock in the yard, and a romping trio of diminutive urchins rolling about in the porch. The house was a good substantial cot, built of the best deodar and fir timber: flat-roofed, and divided into a large principal room, and several minor ones: the flooring as clean as the almost daily washing with white clay could make it. In the outer lobby, or verandah, the implements of husbandry and earthen grain-bins were neatly arranged. This, and the large chamber (beforementioned), were given up to me, my servants, and coolies. I noticed the very simple and effective churn of these worthy folks: it was merely a long spindle, having broad fans, (slightly concave,) in its centre, formed entirely of box-wood, and was propelled in the old manner with a small cord, to which were attached as handles, the *well polished leg-bones of a kid!* My stay of two days was considered amply recompensed by a little gunpowder, which my host, (being a soldier) intended to bestow on the bears: at sunset, he used to leave his comfortable roof with a neighbour, both stick in hand, *selon régle,* to guard his fields through the long lone night. An arduous day's journey, by an untrodden fissure in the Rutan Punjal brought me once more to Thana, on the main thoroughfare to Bimbur.

As more than a year and a half has elapsed since my rambles, I must be excused many omissions, which will become palpable to the interested portion of readers, but want of time having prevented the fulfilment of the present contribution till this hour, memory has *done its best.* I must also add that my *herbarium* was entirely destroyed by the humid climate of the mountains: every newly-dried plant would gradually dissolve into a lump of mouldy fungus, the want of sufficient leisure requiring they should be prematurely enclosed; the same may be said of considerable collections of seeds and roots, but a stay of a month or two later would have furnished me with a more mature and therefore less perishable supply. The case of roses (also containing two choice vines, and a few other things,) arrived in excellent condition at Bimbur: the bushes having cast their old foliage, were in a fresh suit, and exceeded my most sanguine expectations; this was in the end of September, and as may be supposed, the weather intensely dry and hot. The first day's March in the plains settled most of the stock: the remainder lingered till I reached Ferozepoor. In conclusion, I beg to state, that as an individual bent on scientific and useful research, I never received the smallest encouragement from those quarters where one is accustomed to look for it, consequently my time and resources (scanty as they both are) have not placed me in the proper position of one who travels in pursuit of superior information.

Correspondence relative to a Murrain amongst Cattle which recently prevailed in parts of Assam.

[Communicated by the Government of Bengal.]

To A. H. Blechynden, Esq.,
Secy. to the Agri.-Horticultural Society.

Revenue. Dept. Sir,—I am directed by the most Noble the Governor of Bengal to forward herewith for the information of the

Agricultural and Horticultural Society, copy of letter No. 19 from the Officiating Secretary to the Board of Revenue, dated the 17th ultimo, and of its accompaniments, relative to a murrain amongst cattle which recently prevailed in parts of Assam.

FORT WILLIAM : I have, &c.,
9th February, 1854. W. G. YOUNG,
Under-Secy. to the Govt. of Bengal.

FROM *the Officiating Secy. to the Board of Revenue, L. P.*

TO CECIL BEADON, ESQ.,
Secy. to the Govt. of Bengal, Revenue Depart.

FORT WILLIAM, *the* 17*th January*, 1854.

LAND REVENUE.
E. Currie, Esq.
& T. Bruce, Esq.

* Commr. to Board dated 18th November, No. 259, Dr. Barry, Civil Surgeon of Gowalparah to Principal Assist July, 1853.

Dr. Long, Civil Surgeon of Sibsaugor to Collector, dated 12th August and 28th September, 1853.

Dr. Maclean, Civil Surgeon of Debroghur to Collector, dated 14th November, 1853, No. 54.

Capt. Dalton, Collector of Debroghur, to Commr. dated 18th November, 1853, No. 146.

SIR,—In reply to your letter of the 7th July last, No. 563, enquiring whether the local authorities in Assam, can suggest any means of checking such excessive mortality as has there prevailed during the past year, or of preventing its recurrence I am desired by the Board of Revenue to submit herewith in copy, the letters noted in the margin.

2nd. The Board find that the mortality in the district of Kamroop was even greater than was first reported; the deaths from cholera being estimated at not far short of 25,000 persons, while the number of cattle carried off by murrain amounted to the large amount of 120,000. In the Sibsaugor district the thannah reports returned 16,690 deaths from cholera. No further particulars than those already given have been received from the other districts.

3rd. The medical reports are full and interesting, more especially those of Dr. Long of Sibsaugor, who seems to have steadily and closely watched the progress of the murrain. His conclusions are summed up in a further communication, bearing the date of his last report.

"From personal observation, I am of opinion, this cattle disease is fever of a typhoid type, producing by atmospheric causes originating probably at first in emanation from the soil, such as have been, and are now, producing so much of remittent and intermittent fever amongst the people. Contagion also is at work in producing and propagating the murrain. The mortality amounts to about 45 per cent. of the whole stock, 70 per cent. of which are attacked.

"From post-mortem observations, as well as from seeing the symptoms during life, I have ascertained that the lungs and heart are affected, and almost the whole of the alimentary canal inflamed; the whole blood is poisoned, and a species of gangrenous erysipelas is developed during the progress of the malady.

"Treatment of the disease is more effective the sooner it be resorted to. Saline purgatives, with the use of the lancet, in the early stage, followed up with salines, bitter tonics, care and attention to diet and regimen, offer a well-grounded hope for obtaining relief from them.

"Preventive measures are those in which the greatest reliance ought to be placed for checking and staying the pestilence. Careful housing of the cattle in dry, well situated places, improvement of the breed, and attention to the pasturage, may be looked on as useful for guarding the cattle from the influence of malaria; while separation of the healthy from the sick, isolation of the former in places distant from sources of infection, and the use of lime about the cow-houses will be useful to guard against the effects of contagion.

"The use of common salt would, I am of opinion, be found advantageous in the treatment, if medicinal salts are not to be had; half a pound might be given for a dose, and a handful daily mixed up with a mash of boiled rice. I have seen recoveries follow the administration of half a pound of salt dissolved in ginger-water.

"I shall not extend this resume any further, than to say that the epidemic is travelling upwards from the West, in almost a straight line."

4th. The Board fear that beyond encouraging the local officers, to suggest and advise, they can do nothing toward removing the causes, which it is generally allowed favor the visits of the cholera, and aggravate the consequences of murrain. The success of sanitary measures in Assam can scarcely be looked for at present, and the character of the people is opposed to the hope of their even attempting to arrest the progress of contagious disease amongst the cattle.

5th. It is found that in Assam as elsewhere, cholera prevails most in low, ill-ventilated, and ill-drained localities. Its ravages, however, during the past year far exceeded those of any former year. Dr. Barry "states, it will be known for ages as the most malignant, and fatal epidemic that has hitherto assailed the land."

6th. The symptoms of the disease which affected the cattle resembled in some respects those of cholera, and professional opinions seem at first to have regarded them as different forms of the same epidemic. Latterly these opinions were abandoned. "Since my arrival here," (Debroghur), says Dr. Maclean, "alluding to his previous impression, I have been led (principally from the additional light thrown upon the pathology of the disease by the researches Dr. Long of Sibsaugor,) to change that opinion, and it appears to me now established beyond the shadow of a doubt that it is nothing more or less than fever of a low typhoid nature, generated like cholera by atmospheric causes, increased in activity by exhalation from the soil, and afterwards propagated among the cattle chiefly, or at all events in great measure, by contagion."

7th. The prohibition of opium-eating and the more abundant supply of a good description of salt, are two measures of reform suggested in the medical reports. The first of these, so far as regards the growth of the poppy in the Province, is one which the Board recommended to Government in their address of the 15th of October 1852, and which they believe has occupied the attention of Mr. Mills on his late tour of inspection. It is not argued that the use of opium favors such visitations as that of cholera, but that its immoderate use disables the people from struggling against attacks of the disease. It would appear that Dr. Barry has separately addressed the Government on the subject of opium-eating. The salt trade of Assam, the description of salt used, and the price at which it is available to the people of that remote province, were also amongst the subjects to which Mr. Mills' attention were directed. If they are not noticed in his report, the Board will institute enquiries regarding them through the local authorities.

8th. The salubrity of the country will doubtless increase as cultivation extends, and the condition of the inhabitants generally improves, but the tendency of the Province to advance has, the Board fear, received a check during the past year.

9th. The Board suggest, with reference to the concluding remarks of the Commissioner, that the Medical Board be instructed to see that a constant and sufficient supply of medicines is kept up in every district. If at the same time sufficient agency be provided for their distribution when epidemics occur, and simple and intelligible rules of treatment be locally circulated for guidance, all the precautions of which circumstances admit, will, the Board think, have been taken,

10th. Captain Holroyd, the Collector of Sibsaugor, has repeated some suggestions for the improvement of the breed of cattle, by importing bulls from the North-West, but the Commissioner considers them premature, looking to "the low state of agriculture in the Province, the very small holdings of the cultivators, and the total absence of any wealthy or large farmers." Moreover our improved breed of cattle would be as liable to decimation by murrain as the present degenerate breed, if, as the Medical men describe, the virulence and spread of the disease is mainly owing to the neglect of the owners and their cowherds. The good effects of treatment and care cannot be better exemplified than in the case of the cattle of the Rev. Mr. Higgs.

I have, &c.,
(Signed) A. GROTE,
Offg. Secretary.

No. 259 of 1853.

FROM *the Commissioner of Revenue, Assam.*

To *the Board of Revenue, Lower Provinces, Fort William.*

GOWHATTI, 18*th November*, 1853.

GENTLEMEN,—With reference to your letter No. 65 of the 12th July last, and its accompaniment from the Secretary to the Government of Bengal, No. 563 of the 7th idem, directing the Collector to report whether they could suggest any measures for checking in future such excessive mortality as had prevailed during the past season among men and cattle in this province, I have the honor to forward the following replies from the Collectors:—

From the Collector of Kamroop, No. 70 of the 27th July.

From the Collector of Gowalparah, No. 245 of the 28th July, accompanied by a letter in original from the Civil Surgeon, Dr. Barry, on the subject of the epidemic.

From the Collector of Nowgong, No. 36 of the 3rd August.

From the Collector of Tezpore, No. 88 of the 17th August.

From the Collector of Sibsaugor, No. 155 of the 7th instant, accompanied by three letters from Dr. Long, which are forwarded in original with copies of the printed paper circulated by Captain Holroyd, in the Native language throughout his division amongst the mowzadars and principal native gentlemen.

2nd. I regret the delay in forwarding these reports, but it will be observed that they have been waiting for Dr. Long's valuable paper, and for the report of the Collector of Luckimpore, which has not yet been received.

3rd. I beg to call the Board's attention to the papers on the subject of the mortality by Drs. Barry, and Long, the latter of which appears to me to deserve particular notices, and after the submission of these professional reports, I feel few observations will be expected from me.

Captain Rowlatt estimates the number of deaths from cholera in his district from April, 1852 to June, 1853, at about 25,000 people, and that of cattle from murrain at 120,000.

Lieutenant Agnew does not mention the supposed number of deaths in his division, either amongst the people or cattle, but I believe the epidemics were little less fatal than in the Assam division.

Both Lieutenant Agnew and Dr. Barry would ascribe the excessive mortality in Assam to opium-eating, but I conceive this is in a great measure fanciful. The inhabitants of the Gowalparah division make use of a very large quantity of that drug, and generally besides are very greatly addicted to bang and to spirits, which the Assamese are not. I doubt altogether that they are more healthy or robust than the Assamese.

Captain Holroyd's report bears most favorable testimony to the indefatigable exertions of Dr. Long, and I beg to bring it to the especial notice of the Board, as I believe he does but simple justice to Dr. Long's zeal, ability, and kindness to all classes to whom his services can be of any use.

Captain Holroyd's suggestions for the improvement of the breed of cattle are very premature in the low state of agriculture in the province, the very small holdings of the cultivators, and the total absence of any wealthy or large farmers.

4th. On the subject of preventive measures, I have very little to offer myself; it is my opinion, formed on considerable experience, that all the Natives are generally very willing to take the medicines and advice of the European Surgeons, when those Officers, by kindness to the natives, make themselves popular amongst them: but they and their assistants can do little in such instances of general disease as we have lately had, and I am sorry to say there is constantly a deficiency of the necessary European medicines in our hospital stores, and too frequently a feeling on the part of the Civil Surgeons, that they are liable to reprehension for a liberal dispensation of the Government medicines to the public under any urgency whatever.

I have, &c.,
(Signed) F. JENKINS.
Commissioner of Revenue.

No. 1.

TO CAPTAIN HOLROYD, *Collector, Sibsaugor.*

Letter No. 337 of 1853, in original from Col. Jenkins, Commissioner of Revenue, forwarding copies, 1st letter of No. 65 of 12th July, and 2nd letter of No — from Secy. to Govt. of Bengal of the 7th idem.

SIR,—I have the honor to acknowledge the receipt of your letter No. 85 of the 30th ultimo, together with the enclosures noted in the margin, "on the subject of the late sickness prevailing in this province in the form of epidemic cholera, and the murrain amongst the cattle."

I have delayed a reply to your letter, in order that I might first institute enquiries relative to the disease amongst the cattle in the vicinity of Golaghat, (for I have not had any opportunity of personally becoming acquainted with it, as this neighbourhood has hitherto remained intact.)

From the description that has been given to me of this epidemic amongst black cattle, it appears, that animals previously in good health, are suddenly affected with purging, that profuse watery discharges, similar to the dejections of cholera in the human subject, take place; and that the disease going on, the beasts sink in the course of twelve or fourteen hours. I am informed that this type of the epidemic is at present confined to Golaghat and its neighbourhood, but that to the eastward of that locality, and extending to near the Thazee, a mild form of the disease prevails, characterised by slight fever and sore feet. I have not been able to learn that, in any instance of the more severe and fatal type of the epidemic, there is any premonitory symptom, or is there observed any disturbance of the general health before the severe symptoms are seen; boils and gangrenous ulcerations, are said to be absent. Every person with whom I have spoken, stated, that there is no affection of the mouth or gullet. These statements, if true, would point to a new form of disease in black cattle, bearing some of the characters of epidemic cholera in man, but I must here state that I have not been able to meet with any person from Golaghat direct, who had himself seen the disease. My information has all been obtained at second-hand from men who had heard only of the affection from others. It is possible, though all speak of the purging as the only prominent symptom, and as the first that is observed, yet in reality this is not the case; but that previously to the appearance of diarrhœa. the cattle may have been ill with low fever of a remittent and typhoid type, and that the people, from want of the power of observation, may have supposed the cattle to be affected with disease first when, in the progress of the fever, the mucous membrane of the small intestines had become diseased, and diarrhœa developed in consequence. I am inclined to think that it is so, from the very great prevalence of remittent and intermittent fever throughout the whole district at present;—all classes of the native community are suffering;—there is scarcely a single house in which one or more may not be found ill of fever of a bad kind. It is probable, that the same causes which are producing fever in man, are also acting on cattle, bringing on fever differing only in character somewhat from the type prevalent amongst the people of the district.

I am so ill informed on the subject, that it is with much hesitation I venture to suggest any measures for checking or controlling this epidemic; however, on a consideration of the origin of cholera, and the causes by which I humbly conceive it to be propagated and diffused amongst men, reflecting also on the causes that are producing so much fever at present among the inhabitants, I may venture to offer the opinion, that this murrain, though it be primarily dependent for origin on atmospheric influences, yet is sustained, and is so widely diffused, by the bad and unwholesome state in which the cattle is kept all through the province. The country itself is very wet and damp; it is badly drained, and very imperfectly cultivated, there is consequently much marshy land. To guard against the evil effects of the climate of such a country, the inhabitants adopt no measures whatever. Every homestead has invariably close bye almost some stagnant pool or pools of water: the barrie is generally seen surrounded with a ditch, which is full of weeds and muddy water. In the same court-yard with the dwelling-house, the cattle shed is usually placed. In every case these cow-houses are dirty and wet, the dung is barely shovelled or rather scraped outside the pen, and is left piled up literally under the eaves of the house. This dirty state in which the cattle is kept, and the very defective sanatory arrangement for the whole farm-house and its offices, must add virulence to any epidemic diseases that may appear, whether amongst men or any of the animals domesticated about them. The breed of cattle in Assam is a weak and puny one, possessing little nervous power. This character of want of power will come in aid of defective sanatory arrangements, to render the cattle at all times more prone to disease.

I have alluded here to the causes of epidemic diseases, and the circumstances which tend to add virulence to them, because I am of opinion that the only means for effectually checking and controlling them, are such as will act in removing the causes in which they originate, and through which they are sustained; and as at the root of these, (at least of such of them as lie within control) are the dwellings of the people and their habits of life, the inhabitants themselves must be got at, and induced to bestir themselves, that they may persistently adopt measures for improving the sanatory condition of their dwellings. It would be impossible for the Government to effect much good by any measures that in its wisdom and benevolence it may devise, unless the people of the country be induced to put their own shoulder to the wheels, and put them in active motion. The present is an occasion I think in which the peasantry could be persuaded to listen to advice. This pestilence amongst the cattle, which is now prevailing in one portion of the district, (a magnified report of which rumour has no doubt spread abroad,) is one of deep interest to all. Any information bearing on the subject, if conveyed in a plain and homely manner, would, I believe, be attended to. Such might be put into the form of little tracts by some person conversant with the people's mode of thought, and then distributed through the villages. In these, there are scarcely any in which, since the establishment of schools, some could not be found capable of reading the tracts, and so of diffusing their contents for the benefit of all. The habits of the people are very favourable for this mode of conveying knowledge amongst them. In every khel or village the people after the labors of the day usually collect together, either in the open air or in their hamghurs, or they carry on very animated conversations together, while each is seated within his own house. Any person reading amongst these people any thing informing them of the murrain, and of the most likely way to avert the pestilence from their houses, would be certain of a willing and eager audience. There is no doubt that the Assamese, as are the people of every country, are slow to adopt any new customs, or to resort to any thing they have not before heard of, but when once they see the utility of a measure they will quickly adopt it. In illustration of this I shall mention a fact. During the present pressure of fever, there are men coming to me constantly, some of them travelling a distance of thirty miles, begging for quinine, the power of which in controlling fever would only have become known here recently. Another instance just now occurs to me of this kind, which occurred a few years ago. The Tamuli Phokhun, brother to Moonsiff Kistonauth Ram, was induced to have one of his children vaccinated, but still doubtful that such a small matter would suffice to protect from small-pox, he soon after had the child inoculated along with others of the family. Seeing that the only child that escaped small-pox was that which had been vaccinated, his faith in its efficacy became established, and since then the gentleman has voluntarily sought for the services of the vaccinator. These instances would lead to a confident hope that time and observation will lead the people to see the utility of attending to the improvement of the sanatory state of their dwellings. Much of what is necessary to protect themselves and their cattle from the ravages of disease, lies within the power of the people. To attain immunity from, or to modify the virulence of a pestilence, they must look to their houses that they be dug and well raised. All pools of stagnant water ought to be drained off, or where this is not practicable, filled up; the manure from the cow-houses and filth of every kind ought to be removed to a distance; the more free from jungle and decaying vegetable matter their barries are kept, the more healthy they will become. To effect this, it is not necessary or desirable to clear the place of trees, but the coarse useless jungle and weeds which are now allowed to grow luxuriantly close up to their doors, ought to be kept down. Where the level of the country offers no elevated sites for barries, some should be artificially made, so that the water disposed to lodge about the place, may be drained off, even to a short distance, where the noxious principles that may be eliminated, may be less powerful to do harm than when generated at their doors.

Improving the breed of cattle will be of use. If the ryots were to pay more attention to the selection of bulls, even from amongst the present stock, and be more careful in the service of them, there would soon be an increase of physical development in the cattle, at present no care appears to be taken by the peasantry in this respect; not only is breeding in-and-in practised, but the most puny and ill-conditioned of the herd is allowed to cover. The only safeguard for obtaining the service of the strongest males is that wisely ordained by nature, recognised of old and expressed in the adage—

"Fortuna favit fortibus."

Any measures calculated to produce a stronger aud better breed of cattle would, I am of opinion, also tend to act as a preventive to the action of disease. The more strength animals possess, the more likely they will be to resist any noxious agents, whether in the form of miasma or contagion.

With reference to present measures calculated to stay the pestilence, I would advise that since the disease is contagious, as soon as any symptoms of it appear in a village or townland, all the cattle unaffected be driven off to some high and dry pasturage, at a distance from every throughfare. The quantity of uncultivated land will render this in most cases an easy matter to find. There is very frequently to be met with in forest jungle, a clear spot of grazing land surrounded on all sides by trees. Such a place would be a good position to take up for the cattle, and there they ought to be kept day and night; if disease appear again there, another and still other changes of position should be had recourse to. While the plague prevails, the people ought to give the cattle some medicinal herbs, having carminative and bitter tonic properties. It would be idle to suppose that the ryots will purchase these; but it is not necessary, the jungles every where abound with wild herbs of this kind. All through the Majulee is a valuable herb, possessing bitter and tonic qualities, it is called Maha Jeeta.* In every place may be found some of the following plants and trees, viz.:—

Possessing bitter and tonic properties:

1	Goonna Teeta,	part	used,	the plant,
2	Kutta Kamija,	,,	,,	plant and seeds,
3	Mora Teeta,	,,	,,	plant,
4	Depai ditto,	,,	,,	ditto,
5	Amon ditto,	,,	,,	ditto,
6	Bahok Teeta,	,,	,,	ditto,

and the following possessing carminative qualities, viz.:

1	Sorjor,	part	used,	seeds,
2	Gorok Sorjor,	,,	,,	plant,
3	Thorrah Kurkur,	,,	,,	ditto,
4	Camphor tree,	,,	,,	bark,
5	Wild cardamoms,	,,	,,	seeds,
6	Bij kutchu,	,,	,,	roots,
7	Mora ditto,	,,	,,	ditto,
8	Puali ditto,	,,	,,	ditto,

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* Vernacular.

9	Phul kutchu,	part	used,	roots,
10	Ghandu ditto,	”	”	ditto,
11	Samuh ditto,	”	”	ditto,
12	Auklum,	”	”	plant,
13	Red pepper,	”	”	fruit.

The above might be given from time to time in the form of infusion; about a chittack in weight generally will suffice for a dose, if infused in a quart of water; but a quarter chittack of the red pepper will suffice for a dose. Such are intended to act as preservatives against the approach of disease, not for the treatment of it when present; of this I cannot pretend to speak at present being so little instructed in its nature. I purpose visiting the out-station of Golaghat in the course of a few days, for the purpose of inspecting the Hospitals there; when in that neighbourhood I would wish, with your sanction, to proceed to the places affected with the murrain, and personally enquire on the spot into its true character. Having rendered myself acquainted with the epidemic, I could then be able to communicate to you for the information of Government the result of my researches.

No. 2.

CAPTAIN HOLROYD, *Collector, Sibsaugor.*

SIBSAUGOR, 28*th September*, 1853.

SIR,—With reference to my letter to you dated 12th ultimo, on the subject of the murrain among the cattle in the western parts of this zillah, I beg to state that in compliance with the wish conveyed in your letter (Judicial Department) to me dated the — ultimo, I took advantage of the opportunity afforded by my late visit on duty to Golaghat for enquiring into the nature of the Epizootic.

On my way, I called at several villages, but did not fall into the track of the disease till I reached the Bor Putro

Goliam village, where the Epizootic, or (to use a more popular word) epidemic, first appeared in this district. From thence the disease was traced to Kennar Gaong and to Golaghat. At this last place I first fell in with any cases labouring under the disease. On my arrival at Golaghat the murrain was on the decline; however, the number of skeletons to be seen showed but too plainly the havoc it had committed.

At some village to the East of Golaghat and at Kachair Haut (four miles distant) the disease was prevailing. During my stay, I spent a fortnight in daily visiting these places, examining the cases of disease, and in conducting post-mortem examinations.

The cases that were examined came under observation at different periods of the disease, some were in the early, some in the middle, and some towards the end of the attack. During the time occupied in my investigations, the cases that were first seen were watched, so that the malady might be traced throughout its course, whether that was to convalescence or death.

In commencing my enquiries among the ryots, the description I received of the disease from them, I found, gave me little or no aid in forming an idea of the nature of the malady. As it was conjectured by me when I had the honor to address you first on this subject last month, and when I had not seen any case of it myself, I found that the attention of the people was drawn only to the symptoms of an advanced stage of the disease, viz., to the purging and prostrating of strength, while disease had been going on unobserved for some time before these symptoms appeared.

Before alluding to the causes of this epidemic, it will be well to give as concisely as the subject will permit, a description of the disease as it was observed by me, followed by some mention of the post-mortem appearances. The causes will thus be more easily understood, and the measures to be adopted to guard against the invasion of the murrain, to check its course, and to remove it when present, will be less difficult to seize on.

It will be convenient to allude to the disease, under two heads, viz.:—

1st. The premonitory stage.

2nd. The febrile and inflammatory stage.

In the first period there is a short dry *not* frequent cough, the animal's skin has a dry rough look, the beast is listless and dull, and when the cattle are left quiet in the fields, those about to be attacked, or (more properly) that are already labouring under the first stage of the murrain, may be observed to stand apart. This state of things may go on for three, four, or more days, and though it may be deemed trifling, yet it is I conceive of importance, that it be attended to before grave symptoms be developed. Usually about the fifth day or end of the first week, the animals will be observed to give up chewing the cud; they will now resort to pools frequently for drink. With the setting in of thirst, the second stage of the malady sets in, and other symptoms quickly are added. The eyes become watery and suffused, they have a heavy dull look at first, the skin becomes rougher, the heat of it is increased, and now a hot frothy saliva is seen to issue from the mouth, adhering to the corners of the mouth. On opening this, small whitish vesicles may be seen on the tongue and upper palate, the flanks are drawn up, and the pulse is very quick. The breath at the setting in of these severe symptoms is found to have lost its sweet smell, and to have become fœtid, the upper part of the gullet is stiff and slightly swollen, there is much sensitiveness of the external parts. The animals will evince on being handled or pressed about the throat, they evidently suffer pain from attempts to open the mouth; the glands about the jaws, as also those lying along the gullet in most, but not in all cases, are hard and swollen; these, as the disease advances, suppurate, and give rise to the foul ulcers to be hereafter noticed. The eyes about the seventh day are seen to be more suffused, the white portion (conjunction) becoming quite red. In bad cases the whole globe is shrunken and in cattle of a dark colour, the eyes at this period look like globes of fire. The bowels which at the first are costive become about the second day of the febrile stage, relaxed, the dejections consisting of fæculent matter, broken up, and mixed with a dark slimy fluid. They are frequently very fœtid, usually so in severe cases. As they approach a fatal termination, the urine is very scanty, and what is voided is of a deep red colour. The diarrhœa continues throughout the whole course of the disease, if it end fatally before the twelfth day, but in favorable cases, the bowels become quiet about the seventh day. As the disease advances without any favorable change in the symptoms, the animal wastes away, the eyeballs become shrunken, and lie buried within the sockets, a dark, frothy, fœtid liquor is seen around the mouth and nostrils, the breath is very fœtid. Now the pulse becomes small and weak, ulcers appear under the jaws and along the sides of the neck as low down as the brisket, the extremities become cold, while the temperature of the trunk is raised, an eruption of dry pustules appears over the whole of the body, and the hair falls off, if the patient live beyond the twelfth day. When death results from the mere violence of the disease itself, (for many cases are lost through want of care, after the fever has gone off,) this usually takes place on or about the tenth day from the appearance of the more severe symptoms indicative of the second stage.

The more violent the symptoms of fever are at the first onset, the greater danger may be apprehended, and if, as the disease advances, the eyes are seen to become more suffused (that is redder), the skin more tight and shrivelled, the thirst more urgent, the breath more fœtid, and the white frothy saliva of the early stage of the disease be changed into a dark fœtid *liquor*, if the urine is more scanty, and that the ulcers are seen to burrow under the skin, and to discharge a thin, foul stinking fluid, death may be looked for. In bad cases towards the end, I have observed also, that the animals were surrounded by swarms of flies.

It is on the other hand favourable, if we see an early appearance of the eruption with a relaxation of the skin, the more so, if at the same time the bowels become quiet, and the urine more abundantly secreted, that the eye is seen to be more soft, pale and liquid, and with all these favorable signs if the thirst diminish, and rumination return, a favorable convalescence may speedily be expected. The breaking out of ulcers I do not look at as a bad symptom. If there be any of the above noted favorable symptoms present, and the ulcers discharge a thick cream-like matter, while they themselves present a clean, bright red surface, the case will do well, if care be taken, but the formation of abscesses, and conversion of them into ulcers, is a grave symptom. They run down the patient's strength, and the animal is in danger of being worn out with the irritation. Under any circumstances in such cases great care is required, not only to support the strength, but also as to cleanliness and dressing, so as to prevent the ulcers becoming nidæ for the eggs of insects to be deposited in. I believe that many cases may be lost from want of due care and attention to these points.

It is not of course to be expected that every case will present all the symptoms above noted, or that they observe exactly the same course as to the period of their appearance. In some the symptoms are very mild. The animal being but slightly indisposed, is first seen to eat less, and to have a frothy saliva about the mouth. This, with heat of body, slight thirst, a sponginess of the bars of the palate, and mild diarrhœa, constitute the whole train of symptoms which pass off about the end of the eighth day, leaving the beast much emaciated, and with a scurfy state of the surface, from desquamation of the cuticle. From this mild form to the most severe, many varieties may be met with. In some the premonitory stage may be short, and the febrile stage set in with very great intensity, death being the result so early as the sixth day, while in others this may not take place till the end of the second week.

Recovery was slow in all the cases that came under observation; the same was stated to me by the people. In the more severe cases the emaciation was extreme; but even in the mildest form, convalescence was very tedious, flesh and strength not being recovered till after some time.

From this description of this disease, it will be seen that the one which was given in my former letter (and which was drawn up, as there stated, on hearsay only,) is entirely incorrect. This malady is by no means so sudden in its attack, so rapid in its progress, nor so fatal in its character as was there stated. The opinion which I there hazarded, founded on a consideration of the public health of the district, that this disease was of a febrile nature, is nearer the truth, as is also the supposition that the people mistook a grave symptom of an advanced stage of disease for the malady itself; that it is entirely different from what popular rumour had it, is apparent from what is stated above; this will be more so, as we detail the result of our post-mortem examinations.

I was not able to meet a carcase within a few hours after death for my pathological researches. It is customary with the people, when a cow or buffaloe is so ill as to give little or no hopes of recovery, to drive the animal to a distance, so that it may not die near their houses. The dogs, jackalls, and birds of prey (vultures and adjutants), many hundreds of each kind, were constantly in the track of the pestilence, had always precedence of me, but in no case that I examined was any injury done to the subject, beyond destruction of the eyes in all, and some injuries to the mouth and rectum in many. I had however ample means to ascertain the state of the internal organs, which being engaged in the disease, were what it was of importance to become informed of.

Without entering into the minutiæ of my examinations, it may suffice to state generally the result.

Externally the emaciation was great, the cellular membrane beneath the skin, over the jaws, and along the side of the gullet, and over the chest, was affected with gangrenous inflammation, the parts were blackish, and a thin matter was diffused among the deeper muscles. In the mouth there was nothing particular, beyond some slight ulceration of the mucous follicles. The gullet was inflamed, its living membrane detached, being in shreds; in the passage was found a dirty, browny fœtid fluid. The paunch was enormously distended with grass, its mucous coat inflamed in large patches, the honey-combed stomach contained a dark green fluid, which stained the coats. The third stomach or mampler, contained a similar fluid, but the mucous coat of this, as also of the true stomach, was much inflamed. This inflammatory state was continued into the small intestines, diminishing in intensity downwards, till the small gut is near its end, where the inflammation was again found in an intense state. The large intestine contained a fluid of a bright yellow colour; in the colon there were generally some lumps of solid fæces. There was no inflammatory signs in the great intestine, the kidnies were slightly congested, the liver was of a dark, livid colour, and was soft. The gall bladder was distended moderately with yellow bile. The spleen was much disorganized, softened, and broken up; it retained little of its natural appearance, it was like a bag filled with dark grumous blood; in every way it resembled that of a man who has long been ailing with intermittent fever.

The whole of the respiratory organs exhibited the signs of intense inflammation. The pipe* throughout to its minutest subdivisions, presented patches of inflammation of a gangrenous character. The lungs contained abscesses filled with a dry cherry-like matter, or the interlobular tissue was infiltrated with pus of a dark, brown livid colour, resembling what was seen to issue from the mouth and nostrils during the latter periods of the illness.

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* Trachea, hanging, and bronchial tubes.

The heart was much softened, and of a pale, yellow colour, its cavities contained black grumous blood. The lining membrane of the large arteries was of a bright pink colour, the blood found in all the large veins was similar to that in the heart. The brain was not examined, the symptoms during life did not indicate any lesion of the organ; as time was limited, and no fitter instrument than a coolie's dao was at hand for opening the skull, no attempt was made to do so.

The definition I would give of this disease, is that it is a fever of a typhoid type, in which the lungs are chiefly engaged. I do not however mean to state that the lesion of these organs is the cause of the fever, the whole system is engaged; it would perhaps be more correct to describe it as fever induced by the action of a morbid poison, by which the quality of the blood is itself altered, the nervous system depressed, and finally the organization of the body engaged, as is seen in the lungs, heart, and alimentary canal, as also in the muscular and cellular tissue. In many of its features it resembles a disease I have seen amongst the poor resident in that most wretched locality in the city of Dublin, called the Liberties, a disease which in our hospitals there was known by the name of "diffuse inflammation."

In attempting to ascertain the ratio of the sick to the whole number of the cattle, as I was aware that I could not find correctly the number attacked, nor the total strength, I was content with taking a few cases at random.

I found a few homesteads in which there was no case at all, while in others close by three-fourths of the stock were carried off. From all I could learn, the number attacked is about 90 per cent. of the whole stock; about one half of the cases die, giving 45 per cent. of deaths in all. Though this average may be incorrect, yet it is certain that there are very many cows, &c., carried off by this pestilence. At Kumar Gung, Golaghat and Kachair Haut, I saw the paths and fields strewn with skeletons, and at Kachair Haut where I found the disease, the air was tainted with the carcases lying about. So strongly was it filled with the effluvia, that a copperish taste was very sensibly felt in the mouth when in the neighbourhood. From my own personal observation, I can state that in some of the homesteads visited by me every head of cattle in the place was attacked.

The progress of the disease is from West to East. In this district it appeared first at the Bur Putar Goham village, and at Morung: the epidemic had been prevailing for some time previously on the North bank of the Brahmapootra, opposite to the Dhursinnik, and in the districts of Nowgong and Durrung to the West. Two months before it appeared in this zillah as an epidemic, it is stated by the people that five cases occurred on the farm of a Mohunt at Kachair Haut, who had purchased a buffaloe from some Meroes, who came up with it from a place in the Nowgong district, where the disease was then prevailing. The animal was sick when brought up, and soon died; four other buffaloes along with it quickly followed. In tracing the disease from the spot it first fastened on, the course is nearly due East from Morung to Golaghat, and thence on till it reached Kachair Haut, where we left it prevailing.

The causes that originate this disease are, I am of opinion of two kinds, the one remote or predisposing, the other exciting or proximate.

The exciting cause or causes depends on some peculiar condition of the atmosphere, similar in its mode of action to that producing cholera and other epidemic diseases.

Without entering on any examination of the very obscure question as to how such a state of the atmosphere is induced, it may be assumed that a chief cause in the present case, is an intensity of the malaria, which is always a concomitant of woods and marshes in every country; that this is more active this year is evident, from a consideration of the number of men who are suffering from fever of a remittent and intermittent type. Such prevails throughout the whole district; but more particularly to the westward, where this Epizootic is now raging. At Golaghat the number of sepoys ill is in the ratio of 33 per cent. of the strength. All classes are prostrated, the magistrate and his were ill, a European planter (—the only one in that neighbourhood) also had bad fever. I myself, while engaged in my investigation, had a slight attack of ague. The people in the courts, and those in the bazars suffered, and are still suffering, from remittent fever.

If it be assumed that there is an unwholesome condition of the air capable of affecting the cattle with disease, *sui generis*, it is easy to see that when a number of sick cattle are together, the effluvia from their bodies, with the stench from decaying animal matter alluded to, will be able to breed a contagious principle, which comes in aid of the atmospheric poison, to spread the disease far and wide.

The remote causes may be described as including all those circumstances which lower the tone of the nervous system, and the vital energies, such as scanty food, bad air, bad management in breeding, &c. As in my former communication these subjects were adverted to, it will be unnecessary again to allude to them, I shall conclude this part of my subject by stating two points that act very much in producing a weak and degenerate breed, the one is the grasses of the country on which the cattle are fed: these are wild and coarse; no care is taken to provide or prepare a good pasturage for the cattle, the grass the cattle get is not nutritious enough: add to this the other point I wish to allude to, viz., the practice of the boys and girls employed to herd the cattle, which is, to keep shouting out, and driving the unfortunate cattle about, so that scarcely a moment is allowed to them to lie and chew the cud.

In turning to the subject of treatment for this murrain, I must premise that my opinion will be founded only on theory, deduced from analogy. I have had no practical knowledge on the subject, and my opportunities for practically becoming acquainted with cattle have been very few.

The number of recoveries that take place without any aid, ought to encourage us to hope that if a judicious plan of treatment were adopted much success would result; if I have rightly examined the disease, and formed a correct judgment of its nature, a step in advance is gained in the proper way to arrive at a successful plan of treatment. The time when most good can be done for the sick is in the early stage of the affection, when the premonitory symptoms of cough, dulness, langour, &c., are first noticed:—the first symptoms should be attended to; the cow ought to be kept in a clean dry place, and a dose* of glauber salts mixed with ginger, and the whole dissolved in warm water, ought to be given at once. A mash of bran or boiled dhan or rice should be given frequently, the animal to be fed on dry grass, when it can eat, or on mashes. As the ryots have not any glauber salts, nor the means to procure them, common salt might be substituted. I have seen recoveries quickly follow the use of half a pound of common salt, dissolved in ginger water. The daily use of a handful of salt with the mash I would also recommend. If there be any cough observed, a vein should be opened, so that blood may flow in a full stream; from one to six quarts, (varying with the size of the animal) ought to be drawn in one bleeding. A small weakly cow may not require to lose more than a seer, while a large buffaloe will require the loss of six or even more. It is as a rule, better to draw two quarts in one bleeding, than treble the quantity in dribs and drabs. If there be none who can bleed (and I am afraid this is the case in most villages,) as leeches are numerous, fifty to sixty or even a hundred or more may be applied to the chest. After the bleeding a saline purgative ought to be given. As above noted, it will be well to note that it is useless administering any medicine in the solid form to any animal of the ruminant class, every kind of medicine must be given in the liquid form. Throughout the whole course of the disease, the animals ought to be kept in a dry, airy house, where they should be supplied at short intervals with small quantities of tepid water, having a very small portion (half tolah to three seers) of salt dissolved in it; the strength is to be kept up by the assiduous use of mashes. After the effectual administration of purgatives, bitter tonics should be given; the Chiretta* of the bazars, the Kutta Karringa of the jungles, and others of this class, as noted in my former letter, may be used with advantage. There are others which would be very useful, but as their price renders their use impracticable, it is unnecessary to allude to them.

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* *Dose.*—Take ginger two chittacks, boil gently for five minutes in a quart of water, strain; in this decoction, to be called ginger water, dissolve iij. oz. glauber salts (sulphate of soda): administer by means of a horn.

Where saline purgatives cannot be given, glisters may be employed, the apparatus for them any one can prepare; a small bamboo rounded and smoothed at one end, a foot or more long, will answer for the pipe, while a piece of cow-hide or buffaloe skin, capable of containing three or four seers, when sewn into the shape of a bag, will do for the other part. With this two or three quarts of warm water may be injected up a posteriore. The use of glisters would, I believe, be found very useful, whether any medicines were given by the mouth or not; glisters might be used daily twice during the attack.

* *A Dose.*—Chiretta, half an ounce, water tepid one seer; infuse for two hours, to be given twice a day.

When ulcers appear, they may be washed carefully; chloride of lime mixed with water, or pure lime water, or salt and water, will be found a useful lotion. After carefully washing the ulcers, (and this ought to be done very often,) they ought to be covered with finely powdered charcoal, recently prepared. It is well to wash out the mouth from time to time with a little salt and water.

The presence of diarrhœa ought not to deter from the use of purgatives, though it may enjoin more caution in their use. A seer of common oil, mixed with some warm water, and two chittacks of salt, would be in such circumstances a good purgative.

With the enquiry as to what ought to be done to remove the disease, is necessarily associated the still more important question as to what ought to be done to lessen the predisposition of the animals to the attack, and to guard against the outbreak of such a pestilence at all. As bearing on these, the points to which allusion was made in my former letter are I conceive of importance; for every thing that can tend to improve the breed of the cattle, to impart to it greater strength and more of vital energy, will tend in an equal degree to make them less liable to the ravages of any Epizootic that may appear, while every improvement in the sanitary state of the country will render the appearance of disease of more rare occurrence.

To guard against the influence of contagion, an early separation of the sick from the healthy ought to take place, and every means adopted calculated to guard against the introduction of strangers into the herd. -Even men from infected districts ought not to be allowed to go near the places to which it was recommended the cattle should be driven off. In a community like that of India, where there is so little traffic, this is a point can be easily secured. I make this recommendation, fully believing that the disease does not depend for its origin on contagion; but while I am of opinion that a primary cause exists in the atmosphere, which no quarantine can exclude, yet it is my opinion that this ærial morbid poison is much aided by contagion in its powers for evil. It will, then, I think, be found useful in staying the progress of the murrain, to attend to this segregation of the cattle. Where it is found impossible to move a herd away, clean, dry, and elevated spots for piquetting by night should be chosen. Where the cattle are kept under cover by night, I would recommend the houses to be constructed with tatties, plaistered with mud, four and a half or five feet high, ventilation being well provided for above. By this means they (the cattle) will be protected from the injurious influence of the night air, while a uniform temperature will be kept up. The use of fresh lime in and about the farm-houses and cow-sheds would be useful for disinfecting purposes. I shall here mention a fact in illustration of the good to be expected from the measures of precaution recommended. I visited several Mesria villages, but did not meet with a single case of the disease amongst their cattle. These people you are aware, live in isolated positions, holding no intercourse with the rest of the world except by boat; their houses are well raised from the ground on wooden and bamboo platforms, so that they enjoy a free circulation of air below. This exemption from epidemic disease was experienced by the people themselves during the late season, when cholera was decimating the Assamese. The Mesries appear to be a fine, healthy, hardy race, and give clear evidence in their ruddy faces that they suffer not so much from the endemic diseases as their neighbours. The use of a more generous diet, and their general habits may have something to do with this, but still their well-raised houses must do much also to preserve them in health.

In closing this report, I beg to say that I offer it with a full sense of its many defects. One more conversant with the diseases of cattle would have been able to have noted perhaps points that escaped my attention. My observations, however defective, have I trust enabled me to ascertain something of the true nature of a disease, about which such erroneous notions were abroad.

Those who are acquainted with the histories of epidemics amongst cattle will not fail to recognise a similitude in the one under review to some of those that have within the present century passed through Europe.

If I have rightly interpreted the symptoms of the murrain, and described them so as to enable others (whose duties lead to the practical knowledge of cattle and their diseases,) to suggest measures for relief, I shall feel that my task is accomplished, and that my labours, however they may have been at times rather disagreeable, have not been wholly in vain.

I have, &c.,
(Signed) W. JOHNSTON LONG,
Civil Surgeon.

P. S.—Amongst the measures for checking the violence of this murrain, I find I have omitted to recommend as I should have done, that the burial of the carcases soon after the cattle die, at such a depth that the upper part may have at least four feet of earth over it, ought to be strictly enforced. This measure will remove a great nuisance which is injurious to the public health.

(Signed) W. J. LONG.

No. 54.

FROM ASSIST.-SURGEON A. MCLEAN,
In Medical Charge, Dibroghur.

TO CAPTAIN E. T. DALTON,
Collector of Luckimpore, Dibroghur.

DIBROGHUR, *the* 14*th November*, 1853.

SIR,—In acknowledging the receipt of your two communications calling for my opinion on some points connected with cholera and the murrain, which during the last few months have caused so much mortality among men and animals in this zillah, I have to express my regret at the delay which has taken place in complying with your requisition. This I should have done immediately on the receipt of your first letter, but at the time I had only just arrived at the station, and being as I was, totally ignorant of several particulars connected with the epidemic as they appeared in this part of the province, I circulated throughout the district, with as little delay as possible, copies of a set of questions relating to these affections, in order to enable me to arrive at correct and definite conclusions regarding them. The extreme tardiness with which the returns to my circulars were made, rendered it impossible for me to furnish my report within a reasonably short space of time; even now several of them are still due. As however any further delay would be indicative of carelessness and neglect of duty on my part, I beg to lay before you the following observations, extracted from the materials which I have succeeded in collecting. * * * *

It now remains for me to offer a few remarks upon the disease, which during the early portion of the current year caused such great mortality among the horned cattle in some divisions of the zillah.

The Epizootic in question appears to have pursued a course very similar and in many instances exactly corresponding, to that followed by the epidemic visitation of cholera, by which it was either immediately preceded or followed; and from facts connected with the subject not only as regards this zillah, but others in the Provinces, I feel pretty well assured that both the diseases may with propriety be referred to the same causes, or to causes of a kindred nature. On a reference to the returns received from the mowzadars (alluded to in Para. 1.), I find that in Kullungpore, where the greatest mortality prevailed from cholera, that among the cattle was immensely in excess of what took place in any of the mowzas. Goomeerie occupies the next place in the scale as regards both the affections. Luckimpore also suffered severely from cholera, but as I have not yet had any reply to my queries relative to the murrain there, I am unable to make any definite statement in connection with the latter. But whatever the case may be in this instance, circumstances which came under my observation during the last few months of my residence in Lower Assam appear to me to indicate a very intimate relation between the two, both with respect to the manner of their appearance, and subsequent propagation, and the particular localities which they visited.

The Epizootic first appeared in the lower division of the Province, whence it travelled, through the Sibsaugor zillah, to this one. The cases on the South bank of the Berhampooter were comparatively few, and assumed for the most part a tolerably mild type. In the course of a few days it appears to have entirely ceased in this part of the district, and to have broken out on the North bank, where (chiefly at Kullungpore and Goomeeric) it raged with excessive violence for more than six weeks, the characteristic symptoms being, as is generally observed in all epidemic visitations, most strongly marked at the commencement, and gradually becoming milder until the complaint ceased.

The great difficulty which I experienced in obtaining accurate information about the disease when it appeared last year in Kamroop, rendered the results of my enquiries at that time exceedingly vague and unsatisfactory; but from the reports communicated to me by those from whom I sought information on the subject, I arrived at the conclusion that there were two distinct forms of it, one bearing in many points a close resemblance to cholera in the human subject, and another approximating in its character to dysentery; accompanied with fever of an exceedingly virulent and fatal type.

Since my arrival here, however, I have been led, (principally from the additional light thrown upon the pathology of the disease by the researches of Dr. Long, of Sibsaugor,) to change that opinion, and it appears to me now established beyond the shadow of a doubt, that it is nothing more or less than fever of a low typhoid nature, generated, like cholera, by atmospheric causes, increased in activity by exhalation from the soil, and afterwards propagated among the cattle, chiefly, or at all events in great measure, by contagion. In the severe cases, the symptoms as described by the most intelligent and best qualified observers, may be described in a few words, as follows :—

For some days (generally from three to five) the animals are observed to be dull and listless, their coat is dry, rough, and staring, and when driven out with the rest of the herd, they stand apart with drooping ears and head, eating little or nothing, and apparently regardless of all that is going on around them.

At the termination of the period just mentioned, the disease proper begins to show itself, being generally ushered in by thirst, to satisfy which the patients are constantly drinking from the pools or rivers in their immediate vicinity. The surface of their body becomes hot, the eyes bloodshot, a copious frothy saliva issues from the mouth, the lining membrane of which is found on examination to be studded with small white aphthous vesicles. The glands of the throat become tumid and painful. The flanks are drawn in, and the beast begins to evince symptoms of great distress. As the disease advances the vesicles in the mouth burst, forming foul unhealthy looking sores, the swelling of the glands of the neck and throat increases, and suppuration, followed by ulcers, which discharge thin acrid matter is the result. The mouth becomes firmly closed; cough, formerly slight, is now increased in severity; the breath loses its characteristic smell, respiration becomes laboured, the pulse beats with increased frequency. The heat of body becomes greater; to constipation of the bowels succeeds profuse and wasting diarrhœa, the urine is small in quantity and high coloured, or totally suppressed. The discharges from the mouth, nostrils, and bowels, assume a dark brown or black colour, and, with the breath, emit a most offensive odour; the eyes sink in their sockets, the extremities become cold, the animal wastes away, until the vital powers have been completely exhausted, and death ensues, generally from the 16th to the 21st day from the commencement of the attack.

Under more favorable circumstances, the violence of the symptoms begins to yield about the 12th day, the diarrhœa ceases, the swelling of the neck and throat subsides; if ulcers exist, the discharge from them assumes a more healthy appearance, the heat of body decreases, the urine becomes clean and more copious, the cough diminishes: in short the characteristic symptoms gradually disappear, and recovery takes place after, in many instances, a very slow and tedious convalescence. During this stage falling off of the hair, and desquamation of the cuticle are very frequent occurrences.

The above is, I believe, a tolerably correct description of the complaint as it appeared in the great majority of cases. It ought however to be borne in mind that in different localities, and under varying circumstances, many and great modifications were observable. In many instances the symptoms were but very imperfectly developed, and recovery took place in 8 or 10 days, or even less, while on the other hand death frequently occurred at a much later period than that just mentioned.

I much regret that circumstances did not permit my holding any post-mortem examinations to assist me in forming a correct diagnosis, but this deficiency was more than supplied by Dr. Long, who dissected several carcases with results at once uniform and conclusive as to the nature of the disease.

The appearances after death as described by him to me briefly are the following:

Great emaciation, disorganization of the cellular tissue and muscles of the neck, throat, and part of the anterior surface of the chest, which contained numerous large diffused patches of dark clotted blood, ulceration of the mucous membrane of the mouth and gullet. Distention of the paunch or first stomach, and inflammation of its lining membrane, an inflamed state, amounting in some parts, to disorganization throughout the remainder of the alimentary canal, as far as the commencement of the large intestine. The liver and spleen much enlarged and filled with dark blood, the former very much softened, and the texture of the latter entirely destroyed. The kidneys slightly congested. The lungs almost completely disorganized, the whole of the tissues entering into their formation being more or less implicated. The heart pale, and its muscular fibres softened, and the lining of its cavities and the large vessels communicating with them red and inflamed.

These appearances, taken in connection with the symptoms during life, afford, I consider, the most satisfactory evidence that the affection is fever of a low typhoid character, inducing death, both by depression of the nervous energy of the system generally, and more immediately by extensive and excessive congestion of the important viscera, contained in the thoracic and abdominal cavities. It is also evident from several of these symptoms and post-mortem appearances, that the blood is poisoned by some morbid principle originating no doubt from causes, which, though perhaps in the first instance purely atmospheric, are increased in activity as well as intensity by those exhalations from the earth which give rise to fevers, remittent and intermittent, dysentery, cholera and many other diseases, in the human subject.

There are also some other circumstances which it appears to me must exercise a considerable influence upon epidemic seizures of this kind, and to these it may be as well as to advert shortly before going further:—

First.—*Contagion,* as already noticed, does much to propagate the complaint after it has been generated, and the more so, as the people, either from ignorance or culpable apathy and carelessness, take no care to separate the sick from the sound cattle. The natural and necessary consequence is that, once established, it carries on its ravages until at least half of them have fallen victims to its fury.

Secondly.—The effects of such an Epizootic will be considerably increased, if precautions are not adopted for properly disposing of the carcasses, and this is never done by the country people, who rest satisfied with driving the animals when at the point of death to a little distance from their houses, where their remains are partly consumed by beasts and birds of prey, the remainder being disposed of by the slow process of decomposition, the stench from which impregnates the air over the whole of the neighbourhood.

Thirdly.—The want of attention to the cattle so universally displayed by the natives in many important respects exerts no inconsiderable amount of influence in producing diseases. The cow-houses, where such exist, are small, low, damp, and abominably filthy. The pasturage is for the most part of a very coarse and inferior description, and but ill caculated for supplying nourishment to the system, and at certain seasons of the year it is also extremely scarce; and though by a little forethought and management a quantity of rice straw, sufficient to supply this scarcity at least in great measure, might easily be stored up for their use, such a provision for their wants is never thought of by their owners: they are therefore reduced to a very small allowance during the months of September, October, November and December, when the rice crop on the ground, and afterwards from the end of the cold season to the commencement of the rains, when (particularly during the latter-named period) poverty and weakness cannot fail to give them a strong predisposition to disease, as well as make them suffer severely from sickness of any kind with which they may happen to be affected.

The opium-eating habits of the people are exceedingly detrimental to the cattle throughout the Province; inasmuch as owing to the drowsiness in the mornings, which results from the use of this noxious drug, the unfortunate animals are never milked in proper time, and it is most commonly from 9 to 10 oclock before they are sent out to graze.

To this it may be added, that the cowherds are almost always young boys and girls, who understand but little, and if appearances are to be judged from careless, about the duty with which they have been entrusted. Their charges are left during the greater part of the day to take care of themselves; for the remainder of the time they are driven about with yells and shouts from one spot to another, so that they are neither allowed time for the selection of their food in the first instance, nor for rumination afterwards.

In breeding again several important mistakes are committed. The males and females are allowed to mix constantly together; their reproductive powers consequently called into operation at a very early age, their offspring is, as might be expected, small, puny and delicate, and so far from endeavouring to remedy these deficiencies by a more than usual degree of care in the rearing of the calves, the people invariably curtail their allowance of milk to such a minute quantity, that they never attain any thing like their full age, and stunted in their growth, and feeble in constitution as they necessarily are, often suffering such hardships, it need not be a matter of surprise that but a very small proportion of the whole should ever reach maturity, or that those who do so, exhibit a great deficiency both in size and stamina.

These evils are of necessity constantly increasing, and this must continue to be the case until the present system of management is abolished, and its place supplied by one founded on more rational and enlightened principles, an event which to all appearance is still pretty distant.

Regarding the amount of sickness and mortality, the information in my possession is by no means satisfactory. In Goomeeree and Kullungpore the deaths, according to the mouzadar's report, amounted to two-thirds of the whole stock, few if any recoveries having taken place; in other localities again the ratio of both was much smaller, in some places almost all the animals attacked (amounting however to but a very small number) recovered, and throughout a great portion of the district not one case was observed. Under such circumstances it is difficult to strike a correct average, but if we suppose that in the affected mouzahs 60 per cent. were attacked, and that of these 40 per cent. died, it will, I think, give a very close approximation to the truth. On this point, however, I speak under correction, as I have no certain data on which to ground my supposition.

In offering a few remarks upon the treatment likely to prove of service in this alarming complaint, I would beg to premise, that not having had an opportunity of experimenting personally, it is impossible for me to speak with any degree of confidence on the subject. It appears however highly probable that if the disease were noticed in the premonitory stage before the accessation of febrile symptoms, its course might in many cases be effectually checked by removing the patient to a warm, dry, comfortable house, and giving at once a full dose of common salt, or (what would be still better, though I fear in this part of the world unprocurable,) glauber salts. The food should consist of bean mashes or a small quantity of boiled rice, and a handful of salt should be given every second morning, till the health has been re-established.

The post-mortem appearances observed in the thorax cavity would indicate general bleeding if the second stage has commenced. In cases where this is impracticable from 40 to 60 or 80 leeches, according to circumstances, applied to the chest, would most probably afford relief. These measures might with great advantage be followed up by a dose of calomel and antimony, and in the course of two or three hours a purgative, consisting of common salt, glauber salts, castor oil or mustard oil, the latter either alone, or in combination with any of the first-named medicines, appear most likely to prove serviceable.

Enemata of warm water alone, or mixed with any of the substances just recommended as purgatives in double quantities, might prove beneficial for clearing out the large intestine, after diarrhœa had set in, otherwise I should not feel disposed to place much confidence in them.

During the stage of convalescence, nourishing food with, if circumstances permitted (which would I suspect be but seldom,) some of the bitter tonics, as the chiretta, the Katkarinja, &c., might be employed advantageously for the purpose of recruiting the strength, and restoring the tone of the digestive apparatus. Ulcers might be washed with salt in water, or a solution of sulphate of copper or alum, the *tooteeah* and *fitkeeree* of our bazar, and covered with some substance such as ghee, oil, or powdered charcoal, which would protect them from the attacks of insects, and prevent the latter from depositing their eggs in them. Sores in the mouth might be treated successfully by any of the applications just proposed for them in other parts of the body.

The means best adapted for affording protection against the recurrence of a similar Epizootic, and checking its ravages, should it unfortunately again appear, next demand attention, and as it is from the former alone that any great or permanent benefit can be expected, our attention ought in my opinion to be principally directed towards them.

As all causes which tend to deteriorate the breed of cattle predispose more or less to disease of every kind, it is evident that the first step in the right direction would be the adoption of measures calculated to improve it, by the infusion into it of fresh blood, if this could possibly be effected, as well as remedying the different abuses complained of in a former page.

The cow-houses should be large and airy, with the floor raised at least a foot above the level of the gr[illegible] or what would be still better, with *changs* or *ma*[illegible] for the cattle to sleep on, and arrangements should be made for disposing effectually of the dung and urine.

In cases where the cattle are not housed, a spot at once high, dry, and clean should be selected for picqueting them at night. The scarcity of pasture from which they suffer during certain seasons of the year should be made up for by laying in a stock of straw for their use. This would serve to keep them in good condition, and en[illegible] them to resist, infinitely better than they can under th[illegible]resent regimen do, any morbific influences with which [illegible]ey [illegible]y chance to come in contact; and should disease of any kind break out among them, a far smaller ratio of mortality would also be the necessary result of the adoption of such a salutary measure.

They should be let out every morning at daybreak, and allowed to feed at their leisure until evening, and the care of them should be entrusted to people who have sense enough to look after them with an ordinary degree of attention.

As cows in this Province have seldom much milk, the calves should be allowed the whole of it, until they are at least a month old. Their share may then be lessened gradually, until they are able to dispense with this kind of nutriment altogether. The effects which would follow from the adoption of such a liberal system are too evident to need any further notice.

The bulls ought to be kept separate from the rest of the herd, and should not be permitted to serve cows until they have reached the age of at least 2½ years, and a similar rule should be observed with respect to the females, who suffer perhaps more than the others from the early age at which they commence breeding, under the present system of management.

For checking the progress of this or any similar visitation, the contagious nature of the disease suggests the separation of animals from the rest of the herd to which they belong, on the appearance of any suspicious symptom, as well as the exercise of constant vigilance, to prevent cattle belonging to any village or flock in which disease is either apparent or suspected, from mixing with healthy ones. It is difficult to over-estimate the importance of such precautions; in fact there are good grounds for supposing that the drawing of a *cordon sanitaire* round healthy villages at a sufficiently early date would in many cases procure them complete immunity from the disease.

To guard against the bad effects of exposing the carcases to the action of the atmosphere, I would suggest the propriety of enforcing the burial of them at a depth of at least three feet from the surface of the ground, and at some little distance from the house or village to which the animal or animals belonged.

To sum up the whole of the foregoing paragraphs in a few words, the objects contemplated, fraught with importance as they are to the native community at large, can only be successfully effected by:

First.—Improvements of the breed, which will render it less liable to be affected by the causes of disease whatever these may be, and—

Secondly.—Attention to cleanliness and pasturage, and the careful avoidance of all those other circumstances which, as I have endeavoured in a former page to point out, exercise such an injurious influence upon the general health and condition of the cattle, not only in this district, but throughout the length and breadth of the province.

In conclusion, I have to apologize for the length to which these remarks have been extended, and for the many deficiencies and imperfections which they contain. For venturing to trespass so long upon your patience my excuse must be the general interest and importance of the subjects considered. As regards the manner in which my task has been performed, I shall only say that no exertion on my part has been spared to render this report as useful and satisfactory as my abilities, and the circumstances in which I have been placed, permitted.

The opinions expressed regarding the pathology and treatment of the Epizootic have been given with great reluctance, as my acquaintance with the complaints to which cattle are subject is very limited, and I cannot in consequence but feel extremely diffident of the correctness of much of what has been advanced. The observations of Dr. Long, however, to whom I am indebted for a large portion of the history and symptoms, and the whole of the post-mortem appearances, afford clear and conclusive evidence upon several points connected with the disease which were formerly unknown, and I can only express a hope that the results of his labors will enable some one better qualified than myself to draw such conclusions regarding its nature, and the means to be adopted for its prevention and cure, as the experience of those skilled in these matters may show to be correct.

I have, &c.,
(Signed) A. McLean,
Assist.-Surgeon, in Medical Charge, Dibroghur.
(True Copy.)
(Signed) E. T. Dalton,
Collector.

No. 146.

FROM CAPTAIN E. T. DALTON,
Collector of Luckimpore.

TO COLONEL F. JENKINS,
Commissioner of Revenue, Assam.

SIR,—I have the honor to acknowledge the receipt of your letter No. 337 of the 23rd July last, calling upon me for a report as to the measures that should be adopted, with a hope of checking such excessive mortality amongst men and cattle as last year occurred in the Assam districts.

The question being a medical one, I called on the medical officer of this division, Doctor McLean, to furnish a report on the subject; this report I received on the 15th instant, Doctor McLean being new to the district, when first called on, delayed replying till he had opportunities of instituting enquiries. I trust on this plea that the delay in submitting my own remarks may be excused.

DIBROGHUR: 18*th November*, 1853.

Cattle Disease.

The coincidence in point of time of this remarkable and destructive disease with the most frightful visitation of epidemic cholera that Assam has ever known, led very generally to the belief that the diseases were identical in character. Doctor McLean is of opinion that they may be referred to causes of kindred nature, but here the resemblance between them ceases.

The disease first appeared in Lower Assam, and gradually ascended the valley through Nowgong and Sibsaugor.

In November, 1852, it broke out with virulence in Kullungpore, a mouza of this district, situated on the North bank of the Brahmapootra, in east longitude 93° 40′, where it raged for weeks, as in all epidemics* more strongly marked at the commencement, and gradually declining until the complaint ceased. The season had been a dry one, and the pasturage ordinarily resorted to at that time of the year, when the cattle are driven and herded away from the vicinity of the standing rice crops, is described as parched up and deficient in nourishment. The buffaloes equally with the cows suffered from an indifference of pasturage, and this extended to the wild denizens of the alluvial flats of the Brahmapootra. I have been informed by a gentleman who was travelling in that part of the country at the time, that in his road from the rivers, after crossing from the Jorehath side across the churs to Kullungpore, he saw hundreds of carcases of wild buffaloes that had died of the disease. It is possible that the contagion spread first through them to the tame herds in Kullungpore. Fortunately for the ryotts on the North bank, the groups of villages forming mouzas, are separated from each other, by bits of forest and reed wastes, miles in extent. Intercourse between the infected and healthy mouzas was prudently suspended, and the disease did not spread on the North bank beyond the limits of Kullungpore and the adjoining mouza Gomecree.

The medical officers in Upper Assam are now agreed that the murrain is not cholera, or cholerine, but fever of the typhus class, affecting the lungs and the alimentary canal from the mouth to the end of the small intestines. Amongst the most remarkable symptoms, the glands of the neck and throat swell and break out into ulcers; the inside of the mouth, gums, and tongue are similarly affected, and the jaws become locked, and remain so from four to seven days.

As far as I can learn, no attempt was made by the villagers to alleviate in any way the sufferings of the unfortunate animals who were attacked. From the apathy and ignorance of the owners they were left to their fate, and from the description of the disease given, it appears wonderful how any could unassisted have recovered. Dr. McLean, after minutely describing the symptoms, says that "Death is induced by depression of the nervous system generally, and more immediately by extension and congestion of the important viscera contained in the thoracic and abdominal cavities"—and post-mortem appearances indicate that exhalations from the earth, such as give rise to fever, dysentery, cholera, and other disorders, are with atmospheric causes active agents in producing this cattle disease.

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* Dr. McLean.

In Cullungpore, the deaths reported are 1,937 bullocks and cows, and 335 buffaloes.

The mouzadar estimates that about two-thirds of the cattle in his mouza were attacked and scarcely any recovered.

In other parts of the district, and especially in the vicinity of Dibroghur, the disease appeared, but of a milder type, and it quickly disappeared.

I have been favoured by the Rev. E. H. Higgs with an interesting* account of the disease as it appeared in his own farm-yard in this station, describing the treatment successfully adopted by him, which is valuable as being very simple and easy to follow for the poorest ryott, the following is an extract from his letter:

"The symptoms were the same in both, viz., a slight purging, the excrement being of a greenish tinge and very fœtid in smell. I administered a purging draught to the Assamese cow, and as it seemed to do no harm to her (though I certainly observed no good effects) I also gave the same to the English cow. The purging was somewhat increased after this, but still there was the same fœtid smell from what was voided. The next day, about 14 hours after the first symptoms were observed, both the cows became affected in the mouth, the gums were observed to be very sore, and the jaws closely and firmly locked together. In the meantime all the other cattle in the stable were similarly attacked, with the exception of the English bull and a very old Assamese cow; both these escaped the disease altogether, though they were both tied up day and night in the same house with the others who were suffering from the disease. The soreness of the gums, and the locking of the jaws seems to be the characteristic feature of the disease, as it appeared here. I observed no purging after the first day. The jaws were closely locked together during a period of from three to seven days, according to the severity of the attack, the animal being perfectly unable to eat during that time. The two cows to whom I had administered the physic suffered somewhat less than three days from this cause, which was the shortest time. When the jaws became free again, I observed that the tongue had a very sore appearance, being covered over with small red pimples, and in a day the whole of the skin of the tongue came clean away. As soon as the new skin had become a little hardened, the animals were able to crop grass again, and I turned them loose, but after seven days more the feet became very sore at the cleft of the hoof, and dark, fœtid matter sloughed away; the animals became quite lame, they recovered of themselves in the course of three or four days, and since then they have been perfectly free from disease.

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* Dated 8th August, 1853.

"All my treatment consisted in keeping the cattle dry and well housed all the time they appeared ill. I also fumigated the house with the smoke from green wood occasionally. I was very particular in not allowing any dirt to accumulate about the animals. Occasionally I offered them rice water or water in which grain and vegetables had been well boiled, this, when a little salt had been added, they sucked up very greedily."

From Dr. McLean's remarks on the remedies to be applied, I abstract the following, as practicable for all classes:

On the first appearance of the disease, the animal should be removed to a dry clean shed, and a dose of common or glauber salts administered; general bleeding is recommended in the second stage, for which the application of from 40 to 80 leeches to the chest will answer.

This may be followed by another purgative of common salt and mustard oil, and in certain cases enema of *warm* water with these substances may be of use.

The ulcers and sores on the mouth should be washed with salt and water, and preserved from the attacks of insects by the application of ghee, oil, or powdered charcoal.

In addition to these remedies care must be taken to sustain the animal by nourishing infusions during the time he is unable to eat from soreness of mouth and lockjaw, and nourishing food and some tonic should be given in convalescence.

In regard to precautionary measures against the spread of contagion, and to render the cattle less susceptible of the disease, Dr. McLean has, I think, touched on most points that appear likely to be of use. I have embodied the substance of his suggestions in the following practical remarks:

When the disease breaks out the sick should be separated from the healthy to arrest contagion. This is totally neglected by the ryotts, and the consequences are obvious. Further a *cordon sanitaire* should be drawn between infected and healthy villages. This has been found efficacious, is recommended, and should be strictly enforced.

The carcases of the dead cows should be carefully buried; at present they are removed but a short distance from the village, and left exposed.

More attention should be paid to the construction of cowhouses, they are generally low, damp and dirty.

The rice straw should be carefully preserved as food for the cattle when pasturage is scarce. It is very generally wasted.

The cattle should be earlier driven to pasture and allowed, under care of more intelligent herdsmen, to feed and ruminate at leisure. At present they are kept tied up till 9 or 10 A. M. and then committed to the charge of small children, who neglect them.

The cows should not be as they now are, drained of nearly all the milk they give. The quantity is small, and for the first month the whole of it should be given to the calf.

The young bulls should be kept separate from the herd, and not allowed to serve cows until both are at least 2½ years' old. The present unrestricted intercourse between the sexes before they arrive at full growth is very injurious to the breed.

The above observations expose the errors and negligence of the Assam ryotts in the management of their cattle. I will have them, together with the simple treatment recommended, when the disease appears, translated into the Vernacular and promulgated.

The Assam cattle have, from centuries of such management, and from interbreeding, degenerated into a very puny race, and an infusion of fresh blood, as well as more care, is required to improve the breed. This the government might assist by a supply of bulls from the Haupper stud.

I have, &c.,
(Signed) E. T. DALTON,
Collector.

TO CAPTAIN E. T. DALTON,
Collector of Zillah Luckimpore.

SIR,—I beg to acknowledge the receipt of your letter dated August 2d, in which you ask me to furnish you with some observations respecting the epidemic disease which has carried off such large numbers of cattle in Assam during the past eight months.

I have great pleasure in complying with your request, as far as I am able, but happily the disease, as it appeared at Dibroghur, was of a very mild description, and I have had no opportunity of noticing the progress of the disease in its virulent form, which I have to state however, is all drawn from personal observation among my own cattle; of which I have upwards of twenty; two of them I should notice are of English parentage.

The first symptoms of the disease amongst my cattle (and I believe this was its first appearance in the station) occurred shortly after my return from the Gowpore and Kullungpore districts, where it would appear the disease raged most fearfully, and where also I saw large numbers of oxen and cows, and wild and tame buffaloes, lying dead in the fields and in the jungle. It was this circumstance that kept me very watchful over my own cows, as I very much feared losing my English cow. She was the first that was attacked, and shortly after her an Assamese cow.

My opinion is, that in other parts of the country, where so many cattle died, the disease must have commenced with strong diarrhœa, and the lock-jaw following on this, the animals not being able to feed, death ensued from exhaustion. Generally speaking, too, the houses in which they are kept are filthily dirty, with scarce a dry spot for the cattle to lie down on, and in the day time they are turned out, exposed all day to a hot sun. If the animals could have been sheltered in a dry and clean place, and provided with the slightest sustenance during the time they were unable to feed themselves, and after they had been weakened by the purging, I believe the disease would not have proved so fatal as it has done. Even an infusion of dried grass, would perhaps have been sufficient to support them over a few days, and it is on these few days that the great danger lies. It is remarkable that the English bull and another animal should have so entirely escaped, they were all the time almost in close contact with the others. The Assamese cow was a very old animal, and it may be that she had at a former period recovered from an attack of the same disease. The English cow suffered much less than any of the others, her calf however, which was born a few days before the appearance of the disease, died. This was the only death that occurred amongst my cattle. I believe it is a feature in the "murrain" as it appears in England that the cows with young calves at their heels generally recover from the disease, but that their calves almost invariably die. The calves in this case died of strong fever, which terminated in inflammation of the brain.

The soreness of the gums, the skin coming away from the tongue in the way it does, and the discharge from the feet, all seem to indicate that there is more or less of fever in the disease.*

I have, &c.,
(Signed) E. H. HIGGS.
(True Copies.)
FORT WILLIAM : (Signed) FRAS. JENKINS.
January 17, 1854. *Commr. Revenue, Brd. of Revenue L. P.*
(True Copies.)
(Signed) A. GROTE.
Officiating-Secretary.

(True Copies.) W. G. YOUNG,
Under-Secy. to the Govt. of Bengal.
DIBROGHUR : *August* 8, 1853.

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* I should have mentioned that the pulse of the animal was observed to be as high as 60 soon after the first symptoms appeared; it remained at this till after the jaws became unlocked. The pulse of an healthy ox in England is said to be 40.

The pulse of my cattle now is on an average at 45.

(Signed) E. H. HIGGS.

A few remarks on the Cultivation of Coffee in Southern India, and the advantages it offers in comparison with Ceylon. By ARCH. J. BROWN, ESQ.

I have much pleasure in complying with your request that I should send you a few remarks on the subject of Coffee planting in Southern India, and the advantages it offers in comparison with Ceylon.

I will first point out some of the greatest of these advantages, and then shew you how I think the cultivation may be most successfully carried on.

The first and most peculiar advantage which planters in this country enjoy, is the abundance and cheapness of labour. The planters in Ceylon are dependent altogether upon this country for their labour. The Kandians have no objection to fell jungle, but they consider it derogatory to dig holes for the plants, to prune the trees, and to assist in picking and curing the berry. The planters, in consequence, are obliged to send to the Tinnevelly and Madura districts for Malabar coolies, who are paid at from 6*d.* to 1*s.* a day; and it has occurred more than once that labour could not be procured even at the latter rate. The actual expense, however, is still higher than I have stated, for the coolies are often taken on to the plantation before they are required, in order to secure them for the time when their services are absolutely necessary.

Compare this with what takes place on many Coffee estates in this country, where coolies from the neighbouring villages are eager to work at two annas a day. There are, no doubt, times when the price of labour in Ceylon is very moderate, in consequence of a larger influx of coolies into the island than the crop requires; but this temporary cheapness is more than counter-balanced by the high rates, prevailing next year, when the disappointed coolies, and their fellow villagers, prefer remaining with their families, to working in Ceylon at prices little better than they can obtain in their own country.

Another great advantage which this country possesses is in favourable weather for curing the Coffee.

And let no one think this to be unimportant. Rainy weather during the curing season necessitates large and expensive stores in which the Coffee may be spread out. When the cherry is ripe, it must be picked—when picked, pulped—when pulped, washed—when washed, dried; and this, whatever the weather may be on some of the Hill ranges in Ceylon, exposed to the rains both of the South-Eastern and North-East monsoons, the most expensive buildings, and the greatest exertions of the superintendent, are insufficient to prevent the coffee from getting heated, either in store, or in transit to Colombo.

In the Mysore and the Shevaroy ranges in this country, the picking season is in December, January, February, and March, when the North-East monsoon has passed, and cloudless skies and bright sun make the curing of the coffee both easy and satisfactory, entirely preventing fermentation, which, even in the slightest degree, would considerably lower the value of the berry.

Another advantage in this country is the cheapness of the carriage *wherever there are roads.* I am speaking within my own knowledge, when I say, that Coffee has been repeatedly sent from Salem, at the foot of the Shevaroy Hills, to Madras, a distance, of 219 miles, for less per cwt. than it cost from Kandy to Colombo, a distance of only 74 miles. It ought however to be borne in mind that Ceylon coffee is sent to Colombo in the parchment, while that in this country is peeled on the estate. The cost, however, per cwt. of merchantable coffee is as I have stated above.

I will not here enter upon the advantages, real or supposed, which I believe the soil of Southern India to possess. The subject is a difficult one, and requires a good deal of examination. Suffice it, for all practical purposes, that land which produces coffee, selling, by last accounts, at from 54*s.* to 85*s.* per cwt. in the London market, must be, at least, equal to any in Ceylon. Even were it granted that the soil here is *barely* equal to that of the latter, the dry weather for curing which planters in this country have, would enable them to turn out coffee of a finer quality than many of their Ceylon brethren could do. A great deal of the coffee sent from Madras and Mysore is dried in the cherry, and ought therefore to rank with Native Ceylon, which it generally exceeds in value.

The Madras Government had some years back a most favorable opportunity of advancing the cultivation of Coffee. Some of the East Indians, stimulated by the success of others who had commenced planting on the Shevaroy Hills, came forward and wished to take small plots of ground, and cultivate them with Coffee. But no sooner did the government see a desire evinced to bring these waste lands into cultivation, than they put on them an upset price, almost equal to that in Ceylon, and, in addition, made them subject to the usual land assessment. Property in Ceylon purchased from the Government there is held in perpetuity at a pepper-corn rent—while the Madras Government would not grant pottahs save on the consideration of a re-assessment in ten years.

This measure had what I presume was the desired effect. No pottahs were taken out, and the land, albeit waste, remained "the property of Government." This stipulation may now be withdrawn, but it was in existence when I left that part of the country.

Taking into consideration the fact that a coffee plantation does not come into full bearing till the third year, it was idle to suppose that a settler, desirous of taking, say, twenty acres of land, could pay the large upset price demanded, the regular land assessment for three years, and all the expenses necessary to bring the land into cultivation, before he had received one rupee as return from plantation. Had Government put no upset price on the land, or had it made a small one, payable after the estate was fully in bearing, and subsequently charged the usual assessment, I believe that very many small planters would have come forward and taken land.

The Shevaroy Hills, too, seemed to be peculiarly fitted for the experiment. Cultivators of small lots could not of course go to the expense of pulping machines, &c., but an enterprising European there, Mr. Pischer, who has done much for Salem and the Shevaroy Hills, had all the best machinery on his estate, and encouraged small cultivators, by giving them good prices for the cherry coffee they brought to his store. And this I conceive, to be the method in which planting might be greatly fostered.

At first, progress would be slow, small plots would be taken and cultivated, the first produce would be cured in the cherrys, and sent down to Madras for sale; but before long some planter able to afford it would erect a pulping machine, and then the smaller planters would find a ready market for their cherry coffee, and would thus be provided with the means of extending their cultivation.

In the above remarks, I do not refer to Europeans, or others with means to enter largely into coffee planting to provide efficient superintendence, and to supply proper machinery; for past experience has proved that if the locality be judiciously selected, *their* success is certain. I allude to the opening presented to the Madras Government, gradually to bring large tracts of waste land into cultivation, and to provide an extended and daily increasing portion of our fellow-countrymen with a fit and profitable employment, the latter being a subject which has already attracted the attention of philanthropists.

The mode of curing coffee has been so often and so fully brought before the public, that I need not encumber my present remarks with the details. But before I close this, I would mention one caution which cannot be too earnestly impressed upon those who are about to clear jungle, preparatory to planting coffee, and that is to find out, before they fell a single tree, the prevailing winds, and the force with which they blow. Let it be borne in mind that no coffee blossom will set if exposed to strong winds. A good belt of jungle to break the force of the monsoon may make the difference between ten cwt. and one cwt. an acre. The belts, however, if left, must not be too thin, otherwise the trees are apt to be blown down, a loss to the strength of the belt, and destruction to the coffee bushes growing below them.

When belts are not required as a protection against wind, they are only a nuisance, taking up room, forming nurseries for weeds, the seeds of which are blown all over the estate, and supplying harbours for jackals and foxes which are very destructive to the ripe coffee.

To these remarks I might have added copies of the accounts of plantations in this country and Ceylon, but I have not the papers by me at present. A practical acquaintance, however, with the working of the estates in both places has convinced me, that, in this country, they may be more cheaply brought into cultivation, and more cheaply worked, than any in Ceylon, while at the same time they yield, *at least*, equally large crops, and equally fine coffee. It only remains with Government to give planters as good a title to the land, and to provide roads, in order to throw all the most weighty advantages into the scale of this country.

NOTE.—Jackals are very fond of the ripe cherry; they eat it whole, and the coffee bean inside the parchment passes through them uninjured. As the berries they eat are the finest, so the coffee that passes through them is the best. In large estates, well cleared, and in dry weather, the boys weeding pick up great quantities of "jackal coffee," but when the cleared ground is small, and the surrounding jungle extensive almost all that the jackals eat is lost.

I know that when we made presents to our friends of a bag of coffee, we sent, as being finest, the "jackal coffee," but of course without mentioning the *natural pulper* through which it had passed.

MIRZAPORE: Believe me, &c.,
24th January, 1854. ARCH. J. BROWN.

Selections, &c.

On the Introduction of the Magnificent forest tree, the Deodar, from India into England.

The cultivation of this magnificent forest tree is about to engage the serious attention of the Government, and one or more of the royal forests are to be planted with it. Mr. Jameson, Director, Botanical Gardens, North-West Provinces, India, sent home last season, by order of the Governor-General, upwards of two thousand pounds of Deodar seeds; and in order that parties now cultivating the India Cedar on a large scale might see the dimensions the timber attains, he also sent home four planks twenty feet in length, four feet and a half wide, and four inches thick, procured in the forests of Kooloo, in the Kohistan of the Punjab. For years past from five to six maunds (400 to 500 lb.) of seed have been despatched annually by him to the Court of Directors, by the overland route, for distribution to public institutions and private individuals; and young plants which, ten or twelve years ago, used to sell for £5 and £6 *each*, may now be had of the nurserymen at twenty shillings *per hundred.*

Cultivation of the Deodar in England.

When, at the instance of the late Lord Auckland, at that time Governor-General of India, the Court of Directors ordered a large quantity of seed of the Deodar to be imported annually* for distribution here, a service was rendered to the United Kingdom, the extent of which cannot, as yet, be estimated. Enough, however, has been seen to assure us that we have acquired in some abundance an evergreen tree of singular beauty, perfectly hardy in these latitudes, and so unlike any other coniferous plant in its manner of growth as to add a new feature to the rich vegetation of these islands.

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* 400 to 500 lb., which are liberally distributed to public and private gardens throughout the country. In addition to the seeds of the Deodar tree, seeds of the following coniferous trees are also sent to England from the Saharunpore Botanical Garden, being collected by the seed collectors of that noble institution in the Forests of the Himalayas, viz:—

Pinus excelsa.
,, Gerardiana.
,, Brunoniana.
,, longifolia.
P. (Abies) Smithiana.
Picea Webbiana.
,, Pindrow.
Cupressus torulosa.
Juniperus excelsa.
,, religiosa.

and lastly, Pinus Royleana, a magnificent new Pine discovered last season in Nepaul, at an altitude of 12,000 feet. This fine Pine grows to a height of 100 feet, and its timber is close-grained, and resembles much the Deodar; and as it is met with at a great altitude on the Himalayas, it will be found to be perfectly hardy in Britain. In form, too, it is highly ornamental, and will thus prove a great acquisition. By the Director of the Botanical Gardens a large quantity of seed has been sent to the India House for distribution throughout the country. Another large supply will be forwarded shortly, and parties who have been hitherto disappointed, may procure seeds, by applying to Dr. Royle at the India House.

We now learn with great satisfaction that the East India Company has ordered a ton weight of the seed of this tree to be placed at the disposal of Government for the service of the Woods and Forests, and that the first parcel has already arrived. Should all this quantity vegetate, no fewer than 16,000,000 plants will have been acquired, and thus we may expect the hills of Great Britain to be speedily clothed with the sacred Cedar of the Brahmins; or making every allowance for deteriorated seeds, the produce to be raised must necessarily be prodigious. The charge of rearing it having been confided to four eminent nurserymen—Messrs. Glendinning of Chiswick; Lawson of Edinburgh; Skirving of Liverpool; and Waterer of Knaphill—we have security for the crop being skilfully managed.*

Government will thus become possessed of a very large quantity of a fast-growing tree, the value of which cannot be over-rated, whether it is regarded as a nurse, most useful for protection, and profitable for thinning, or according to the testimony of those who are familiar with it in India, strong and durable, as timber.

We apprehend that no hardy tree yet known has the same high value as the Deodar, as a nurse. The Scotch Pine is so heavy and compact in its foliage, that it keeps light off the deciduous trees which grow among it, and offers great obstruction to the free circulation of air; doing about as much harm in this way as it effects good by giving shelter from heavy gales. Its poles, too, are so bad that it must always bear a very low price in the timber market. Larch, which is a far better nurse, because its light airy foliage and pyramidal form offer no hindrance to the action of light and the free circulation of air, and whose poles usually fetch a good price, has the fault of being destitute of leaves in the early spring, and is, moreover, subject to the mysterious and incurable "rot." On the other hand, the Deodar combines the graceful form and rapid growth of the Larch, with the evergreen character of the Scotch Pine, without the faults of that species; and we have the evidence of every observer who has seen it in India, that its timber is of excellent quality. As that is a very material point, and since we have occasionally heard it suggested that because the Deodar is nearly related to the Cedar of Lebanon, its timber will probably partake of the bad quality of the latter, it seems worth while quoting the opinions of those who are personally acquainted with it. That no inference can be legitimately drawn from its supposed relationship to the Cedar of Lebanon, is sufficiently shewn by the Scotch Pine and the Pinaster. They also are nearly related; and yet the old timber of the first has great durability and strength, while the latter is at all ages worthless for any purpose except firewood. A similar but more striking contrast is offered by the Pinaster and Pinus hispanica, species surely more nearly allied than the Deodar and Cedar of Lebanon. Now we have the evidence of Captain Widdrington that the latter was largely used in the Spanish navy for deck-planking, a purpose to which Pinaster timber could never be applied.

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* We have consulted one of the above gentlemen to whom part of the seeds have been confided, and we have much pleasure in stating, from his authority, that the seed that was late in reaching this country was successful, and that which was early, unsuccessful.—Ed.

The positive testimony of Indian travellers seems conclusive as to the durability and excellence of Deodar timber. Baron Charles Von Hugel, now Austrian Minister at Florence, a good judge of such matters, saw the tree in abundance, and he calls it "the incorruptible Himalayan Cedar, the invaluable Deodar." Major Madden, than whom no one has more carefully investigated the history of Himalayan Conifers on their native mountains, quotes this very expression of Von Hugel, and evidently assents to it; he even thinks it worth inquiry whether it really repels the white-ant which seems to be a Himalayan notion.

Moorcroft,—and there never was a more trustworthy reporter, in the first volume of his *travels*, makes use of the following language: "The most valuable tree of Kashmere is, however, the Deodar, a variety of Cedar, the timber of which is extensively employed in the construction of houses, temples, and bridges." And he adds, that pieces of it had been found little decayed, although exposed to the action of water for four hundred years.

We have, moreover, the high authority of Dr. Royle, who long resided in the Deodar countries, that the timber is of excellent quality, and of great strength, as well as durability. It is universally employed in the building of temples, in which none but the best materials would be employed. The mode of using it is to construct a solid framework of the timber, and then to fill in the spaces between with stones, so that the main strength of the building is made to depend upon the Deodar, rather than the masonry. Thus used it is exposed to a trial which nothing but timber of the best quality could support. This is in complete accordance with all that we have ever heard of the quality of Deodar wood; and must be regarded as conclusive.

The only subject of doubt in our minds as to the issue of the great undertaking now described, is whether the gentlemen to whom the young Deodars, will be finally entrusted, after they shall have been delivered up to Government by the nurserymen who are to rear them, will know either where, or when, or how they ought to be planted.

(From the Edinburgh New Philosophical Journal.)

On the Physical Aspect of the Punjab—its Agriculture and Botany.

By Dr. Jameson, *Superintendent of the Botanic Garden, Saharunpore.*

(Communicated by the Hon. Court of Directors of the E. I. Company.)

The Punjab, properly speaking, comprehends those tracts of country lying between the six great rivers, which run from north to south, the most westerly one being the Indus, the easterly the Sutlej, and the others the Beyas, Ravi, Chenab, and Jhelum.

It is bounded to the east and south-east by the Sutlej, to the north by the Peer Punjab and Snowy range, to the west by the Indus and the Khyber and Soliman ranges of mountains, and to the south by the states of Scinde and Bhawulpore.

The whole country is of an ovoidal form, lying in a south-west and north-east direction, with the apex towards Scinde, between the latitudes of 29° and 34°, and longitudes 71° and 76°, and occupying an area of about 85,000 square miles.

The Punjab is an extensive and gently inclined plain, dipping to the south, with mountains to the north and west, open to the south and east, and traversed by six magnificent rivers, the Beyas, Sutlej, Ravi, Chenab, Jhelum, and Indus, whose waters, if properly used in irrigation, will ere long render it the Eden of India. But in crossing the Punjab in different directions, the traveller may be led to very different conclusions as to its fertility. Crossing the river Sutlej at Phillore, and proceeding in a north-west direction, *viâ* Jullunder, Hoshiarpore, Deenanuggur, Sealkote, Wuzeerabad, and Goojrat, he would be led to believe that the country was both densely populated and highly cultivated up to the Salt range. Crossing the Sutlej at Hurree-Ke-Ghat, and proceeding *viâ* Amritsir to Lahore, and thence on to the Salt range, by a route 40 miles to the south, viz: by Ramnuggur to Pinddadun-Khan, he would come to the conclusion that cultivation was only carried on to any extent in the first, or Baree Doab, and that two-thirds of the country beyond the Ravi was lying waste. Still further to the westward, and nearer the great desert, waste land in a greater proportion exists, and population is scanty in the extreme.

We have, therefore, three belts, all of which show different results. The first showing high cultivation and a rich and densely populated country. The second partial cultivation, with, here and there, towns and villages, round which good cultivation exists, but the larger portion lying waste. And the third, a waste comparatively speaking with a few villages breaking up now and then the monotony of the Jhar (Zizyphus), Babul (Acacia), and Dhak (Butea) Jungle. But the changes which have been effected within the last four years in the Baree and Rechna Doabs are truly remarkable. When we visited the Punjab in 1841-42, extensive jungles existed in the neighbourhood of the very capital, giving cover to deer, wild hogs, &c., and affording sport to the late Maharajah and his nobles. In our late journey we looked for these jungles in vain, all having given way to the ploughshare, and presenting, in their room, rich fields of cultivation. Such, too, was the case with the Shikargah of Rajah Dhian Singh, on the right side of the Ravi, distant some ten miles from Lahore.

Traversing the country in a north and south direction we meet with bunds, or belts of lands, the former beds of rivers, and showing that their courses have been altered. Thus the Sutlej, which formerly ran close to the town of Loodiana, is now seven miles to the westward. The Ravi, which twenty or thirty years ago washed the walls of the city of Lahore, runs in a channel three miles further west. The Chenab, which a few years ago ran close to the towns of Ramnuggur and Wuzeerabad, is now four miles distant, and the same applies to the Jhelum and Indus where not closed in by mountains.

Throughout the broad, flat plains of the Punjab no rocks are met with *in situ* until we reach the Salt range, with the exception of, here and there, beds of Konkur, a compact marl, which is sometimes mixed with a small quantity of peroxide of iron, giving it a black or dark-brown colour, and clay. Near Jullunder large beds of it occur, and it is there dug and used in making roads, for which it is well adapted. The common kind of Konkur, too, is also here found in abundance. This formation has no doubt been deposited by springs which formerly existed, and appear to have prevailed, and still do so, to some extent throughout India.

By the divisions formed by the rivers, the Punjab has been divided into a series of Doabs, which we shall here notice, as it will be necessary for us to allude to them hereafter.

In crossing the Sutlej at Phillore we enter, as already stated, the Jullunder Doab, which is formed by the Sutlej and Beyas. In crossing the Beyas, we enter the Baree or Manjha Doab, consisting of that tract of land lying between the Beyas and Ravi, including the great cities of Amritsir and Lahore. This Doab is the great stronghold of the Sikh population. In crossing the Ravi we enter the Rechna Doab formed by the Ravi and Chenab. In crossing the Chenab, we reach the Jetch Doab, formed by that river and the Jhelum; and forming the Sind Sagur Doab, we have the rivers Jhelum and Indus. All these Doabs present magnificent broad, flat plains, with a gradual declination to the south, and thus admirably adapted to irrigation. For this purpose, according to calculations made by my friend Lieut. Baird Smith, there is a supply of water now running waste to the sea equal to 12,000 cubic feet per second, which if properly applied would convert these, in many places, waste and barren plains into the Eden of India, and make them one sheet of the richest cultivation. To reap such a harvest capital and hands to guide alone are wanting. Well and correctly, too, has he remarked in his admirable digest of canal operations in the north of India conducted by the rulers of India, that the extraordinary facilities possessed by the land of the five rivers in its abundant supply of water, its wide plains sloping gently from the base of the Himalayas, and the natural fertility of its irrigated soil, would lead us to have anticipated the existence of canals dating from the period of the Mahommedan empire. Of the advantages and value of canal-irrigation to the Punjab there can be but one opinion. No country in India depends more on rain for its crops, and here, too, its fall is most uncertain. For several successive seasons it will occur scanty in the extreme ; and on the other hand, for a like number of years it is abundant. Since the occupation of the country by the British Government it has been well supplied with rain, which has rendered grain exceedingly cheap, and gone far to settle it in the quiet state in which it now reigns. Were canals intersecting the Doabs in all directions, the elements would not be watched with anxious care by the Zemindars, as plenty would be diffused even without rain, and with it happiness and contentment throughout the length and breadth of the land. All the Doabs have their own peculiarities and distinguishing characters. The first and richest in cultivation is the Jullunder Doab, which almost throughout its length and breadth presents in the cold weather a sheet of the richest cultivation. The crops cultivated in the autumn are wheat, barley, chunna, (Cicer Arietinum), Torea, (Sinapis glauca), Tirra, (Brassica Erucastrum), Bakla, (Faba vulgaris), Mithre, (Trigonella fœnum græcum), &c., Kussoomba, (Carthamus tinctorius), a well-known dye. But the crop to which the zemindars look forward to for the payment of their revenue is sugar, which is extensively cultivated throughout the Jullunder Doab. On an average one-fifth of the land may be said to be under cultivation with it, pointing out the richness of the soil and the industry* of the agricultural population. Most of the sugar is raised for exportation principally to Amritsir and Lahore, from whence it is sent to the south to Bhawulpore, and north to Cabul. In many places the soil of the Jullunder Doab consists of a rich black loam, and would, were irrigation available, be admirably adapted for the cultivation of cotton. At present cotton is there cultivated, but in small quantity and of an inferior kind ; this applies to all the cottons in the Punjab examined by us ; all were short stapled and of inferior quality. Wheat is also grown for home consumption, the markets of Lahore and Amritsir being principally supplied from the eastward and southward, as Amballa and Saharunpore districts, Futteh Ghur, &c. Partly for want of water and partly by its saline nature, (Shore Ke Zemin) there is an immense tract in the Kuppoorthulla Rajah's country lying waste. This belt is about ten miles long and three miles broad. In some places where the land had, as in the neighbourhood of Kuppoorthulla, been well broken up and irrigated, we saw good crops of wheat, showing that irrigation alone is wanting to bring it under cultivation, and it might be done by means of the Banniu, a stream containing a considerable body of water. Mr. H. Vansittart, the deputy-commissioner of Jullunder, was then endeavouring to induce the Rajah to lay out some money on this undertaking. Three miles west from Kuppoorthulla we cross the Banniu river, a small stream fordable in the cold weather, but not so in the rains when heavy showers fall. About four miles further westward we meet with the first branch of the Beyas, which is crossed by a bridge of boats, thirty-five in number. These boats are placed alternately, horizontal and perpendicular, and lashed together with strong ropes; an anchor formed of a triangular box, and filled with stones, being sunk in the stream from each boat to keep it firm. On the boats planks covered with straw and sand are placed, which form a substantial bridge. To the river we descend, and crossing it find the Khadur land highly cultivated, sugar forming the staple article; here and there, close to villages, we see a little cotton. This Khadur land, which is nothing but the old bed of the river, is about three and a half miles in breadth, and on traversing it we meet with the main stream of the Beyas, and across it there is also a bridge consisting of twenty-eight boats. On crossing the river we ascend a high bank of from 30 to 40 feet, and get into the Banghur land of the Baree or Manjha Doab. Before proceeding to the Baree Doab we shall notice some of the principal plants met with in the Jullunder Doab. Forming the jungle and covering waste land we find the—

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* To obtain a good crop of Sugar-cane requires most careful cultivation, it being necessary to plough the land many times and manure it strongly.

Bheir (Zizyphus vulgaris).
Akor, Madur (Calotropis Hamiltonii).
Dawk (Butea frondosa).
Jari (Zizyphus Napeca).
Arund (Ricinus communis).
„ (Euphorbia lanceolata).
Oout Katarah, (Argemone mexicana).
Burna (Cratæva Tapia).
Makhor (Capparis sepiaria).
Peasi (Anthericum indicum).
Harmalah, or Isbund Lahori (Peganum Harmala).
Symbaloo (Vitix trifolia).
Karounda (Carissa villosa).
„ (Heliotropium nervosum).
Katul (Solanum).

Forming the timber-trees of this Doab the most characteristic is the Phulahi (Acacia dumosa). The Mango or Amb (Mangifera indica) is abundantly met with, particularly in the neighbourhood of the town of Jullunder and at Hooshiarpore, &c. In the latter district extensive groves occur, and the fruit is said to be of a very superior description. The following trees also occur:—

Chumror or Chelah (Ehretia lævis).
Ceris (Acacia serissa).
Keekur (Acacia arabica).
Bhur (Ficus indica).
Pepul (Ficus religiosa).
Sissum (Dalbergia Sissoo).
Bukain (Melia Bukain).
Toot or Tootree (Morus parviflora).
Lessora (Cordia Myxa).
Dhaul Dawk (Erythrina stricta).

For making ploughs and sugar mills the phulahi (Acacia dumosa), and the Chumror (Ehretia lævis), and Keekur (Acacia arabica) are extensively used and well adapted from their toughness for the purpose.

In this Doab the Mulberry grows with great luxuriance, and silk is a great article of trade at Jullunder. The introduction of the silk-worm might therefore, if properly conducted, be attended with success. The Morus multicaulis had been introduced from the Saharunpore Garden, and is growing with great vigour. The subject is, therefore, well worthy of attention, seeing that in the province itself there is a large demand for the raw material.

The *Baree or Manjha Doab,* though the densest populated Doab of the Punjab, is not nearly so highly cultivated, generally speaking, as the Jullunder Doab. In it generally the soil is light and sandy, and in many places highly saline; water, too, is very distant (80 feet from the surface), rendering it difficult and expensive to sink wells.

In this Doab the most characteristic plants are the Kureel (Capparis aphylla), which occurs in the form of low brushwood, seldom reaching to the size of a tree, as near Delhi its seeds are sold in the bazaars under the name *Taint,* and eaten: the Madur (Calotropis Hamiltonii), Dawk (Butea frondosa), and Furas (Tamarix Furas), and Lycium, a small solanaceous and thorny shrub, presenting with its bright red berry a pretty appearance. Here, too, frequently hills formed by drifting sand are met with, giving cover to thousands of sand partridges; two species occur, the large and small Rock pigeon of sportsmen (Pterocles arenarius and P. furcatus). Jundialah, in this Doab, ten miles from Amritsir, is celebrated for its priests and its thieves; we ought rather to say was, it having been the residence of the Sukh Gooroo; the former, however, now make themselves scarce, but the latter still remain. Between Amritsir and Lahore there are large tracts of waste land, but as we approach the capital, cultivation presents itself, the principal crops being sugar and wheat. In the neighbourhood of the cities of Amritsir and Lahore, vegetables are cultivated on an extensive scale, such as Turnips, Carrots, Radishes, &c., and of great size, but very flavourless. Characterising the Baree or Manjha Doab we have the following plants:—

(Fagonia mysorensis).
Isbund Lahoree (Peganum Harmala).
Kureel (Capparis aphylla).
Jhand (Prosopis spicigera).
Soujna (Moringa pterygosperma).
„ (Lycium).
Khajoor (Phœnix sylvestris).
Bel (Ægle Marmelos).

In the country between Amritsir and Lahore, the Khajoor tree (Phœnix sylvestris) abounds, and stands out in bold relief, presenting a striking contrast to the otherwise woodless country. Here and there the Peeloo or Jhal (Salvadora indica) occurs, but though in the upper part of the Doab it is rare, towards the south it abounds. It is this tree which Colonel Mackeson thus notices in his Journal from Loodiana to Mittionkote:—" At Palra near

Pak-Puttun, the face of the country varies little in appearance, being, day after day, the same succession of Tamarind Jungle, the dark green of which is here and there relieved by a shrub resembling the willow in leaf, and which the natives call Jhall, and from the root of which the Miswaks or tooth-cleaners are made. This tree has been identified with the Mustard tree of Scripture by Captains Irby and Mangles. Leaves similar to those of Salvadora are sold in the bazaar under the name of Rai Sunna,* mustard-and-cress, which probably led them to this opinion, but which however is not correct, as the leaves belong to Barthe (Lotia lanceolata) ;† the seeds of the Peeloo are eaten.

Lahore is celebrated for its garden of Shalimar, but which was little more than dense jungle when we visited it in January, 1850; a third of the trees, or even more, might be cut down with great advantage to the others, as they would then get air and give better fruit, and the wood afford profits to cover all the expenses incurred in the necessary improvements and thinnings.

In the *Rechna Doab* cultivation is much more restricted, unless towards its northern end, than in the Baree Doab, but here the changes are very striking since 1841.

Crossing the Ravi river, extensive jungles formerly existed, which have in a measure given way to the plough, and now present good cultivation. Here the soil is very saline, and is covered with a species of Salicornia, characteristic of such soils. At Shadurrah we meet with a species of Pentatropis in abundance climbing over Mango trees. Species of this genus were first noticed by Brown in Salt's Abyssinia. In the Rechna Doab, the Jhand (Prosopis spicigera) is one of the most characteristic trees. In the upper part of the Doab forests of Sissoo (Dalbergia Sissoo) are met with, but the trees are allowed to grow so close, as to be almost useless, hundreds, though twenty and thirty feet high, not being thicker than a man's arm, The Jhand in this Doab takes the place of Tulahi in the Jullunder Doab. In this Doab, too, Juwassa or Juwansee (the Ooshturkar, or Camel-thorn), Alhagi Maurorum, a plant common in Egypt,‡ is very abundant. From this plant the Toorangbeen, a kind of Manna, is procured and used as a substitute for sugar, and is imported from Persia and Bokhara *viâ* Cabul.

The Punjab plants, and those met with throughout the north-western provinces, do not secrete Manna; but it is not uncommon in the vegetable kingdom to find plants giving secretions in one country or locality and not in another. The same is found to be the case with the Cannabis sativa or Bhang, which in the hills at altitudes of six and eight thousand feet secretes the gum-resin Cherrus, but does not do so in the plains. The

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* The leaves are frequently used to adulterate Senna.

† Madden on the Plants met with in Kemaon.

‡ The similarity of the botany of the north-western parts of India and Punjab with Egypt, has already been noticed by several authors, and will appear more apparent hereafter.

Juwassa is frequently used for making tattees for tents, for which it is admirably adapted, giving out a delicious perfume when watered.

The following other plants are met with in the Rechna Doab :—

Ficus cordata (Kimri).
Acacia arabica (Keekur).
Phœnix sylvestris, abundant near Shadurrah.
Salvadora indica.
Mangifera indica.
Ricinus communis.
Spartium.
Fagonia mysorensis.
Morus parviflora.
Ficus indica.
Zizyphus vulgaris.
Zizyphus Napeca.
Zizyphus jambolana.
Cordia Myxa.
Anthericum indicum.
Dalbergia Sissoo.
Ficus religiosa.
Calotropis Hamiltonii.
Melia Bukain.
Peganum Harmala.
Sida graveolens.
Bauhinia variegata.
Pentatropis macrophylla.
Alhagi Maurorum.

Four miles after leaving Jemadar Ke Baoli, almost the only plant found in abundance in the cold weather is the Salicornia mentioned, until within a few miles of Kamoo, where we met with a species of Tephrosia, the Tephrosia fruticosa, a small leguminous plant, the leaves of which are considered medicinal. Here we found, on the uncultivated plain, Cursorius Fieldii in flocks of ten and twelve, and large flocks of Larks and Buntings, consisting of many species, all of which are denominated and sold as Bagheerus, or Ortolans. Around Kamoo there is some good cultivation. In the Rechna Doab, small abandoned canals, which date from the period of the Mahommedan empire, are frequently crossed, and which were formerly advantageously used, thus showing how easily the whole of this Doab might be brought under irrigation, and water alone is wanted to make it one sheet of cultivation. With water, and thus certain crops, the country would soon be peopled; nor does it apply to this Doab only, it being equally applicable to the Jullunder, Baree, Jetch, and the lower portion of the Sind Sagur Doab. The irregularity of the rains, the poverty of the agricultural classes, and the uncertainty of the Zemindar in the former rule, when his capital was invested in sinking of wells, being allowed to retain his land, may account for the partial cultivation now presented in the Rechna Doab. This is particularly the case with the lands adjoining the high road ; here cultivation is the most limited, owing to the agricultural population dreading the rapacity of the soldiery. In former days might was right, and the soldiery, long in arrears of pay, were forced to supply their wants in the best way they could.

In the neighbourhood of Wuzeerabad we meet with large groves of Mango trees. Here generally the country is well cultivated, and crossing the Chenab into the Jetch Doab, and proceeding north-west to Goojrat, we find one magnificent sheet of cultivation; wheat, cotton, and the Torea (Sinapis glauca), and Tirra, (Brassica erucastrum), oil plants, being abundant and forming the principal Rubbee crop. In February, when we visited it, the Torea and Tirra covered the late field of battle and presented a fine sheet of gold. Wells here abound, and judging from the clear cultivation, and the manner in which the soil is broken up, the agricultural population, consisting principally of Mussulmen, appear to be a hard-working and industrious class. At Goojrat, on the famed battle-field, Cactus opuntia abounds, forming hedges; cotton is much cultivated in this district, but of a most inferior description. In this Doab sugar is but little cultivated, the grains mentioned above being the principal Rubbee crops, and Jowar and Bajra the Khureef. The country generally is highly undulating, consisting of much Khadur land well cultivated. The principal tree of the Doab is the Keekur (Acacia arabica). The Jhand or crooked-spined Mimosa (Prosopis spicigera) is also common. This last is said by Royle, on authority of Burnes, not to extend beyond the Ravi; this, however, is a mistake. Associated with the Keekur and Jhand we have the following plants :—

Linum usitatissimum.
Capparis aphylla.
Butea frondosa.
Cordia Myxa.
Fagonia mysorensis.
Phœnix sylvestris.*
Dalbergia Sissoo.
Zizyphus vulgaris.
„ Napeca.
Morus parviflora.

Ricinus communis.
Acacia arabica.
Parkinsonia aculeata.
Calotropis Hamiltonii.
Ficus indica.
„ religiosa.
Heliotropium.
Melia Bukain.
Acacia dumosa.

In the Baree and Jetch Doabs, viz., at Lahore and Amritsir in the former, and Jelalpore in the latter, and at Noorpore in the Kohistan, shawls are extensively manufactured, but all of an inferior description, owing to the whole of the best shawl-wool being monopolised by Rajah Goolab Singh. This ought not to be the case, seeing that the great breeding country of the shawl wool goat is in that tract of Chinese Tartary lying immediately to the north of the British passes in the Himalayahs, and the wool-traders in order to obtain a market, are obliged to carry their wool several hundred miles to Cashmere. Were a little encouragement given to them, wools in large quantity and of the finest quality would be imported into the British provinces by the Mana, Neetee, Onuta, Dewra, and other passes. Several years ago the shawl-wool traders brought large quantities of wool to Sreenuggur through the Neetee pass, but finding no demand for it, they were obliged to sell it at a great loss. Since then the attempt to get a market has never been repeated.* But now that extensive shawl manufactories exist in British territory, it would be well worth while on the part of the authorities to re-open this trade, and supply the Punjab with fine wool. The shawl manufacturers of Lahore, Amritsir, Jelalpore, and Noorpore might, with a little encouragement, be induced to send their agents to Sreenuggur to purchase the wool, and on the traders being informed through means of the authorities, that there would be a good and ready market for their produce, they would willingly resort there in preference to making the circuitous journey to Cashmere. At least the trade is sufficiently important and extensive to be worthy of trial. To introduce the produce of the Trans-Himalayan States, nature has marked out that route *viâ* Neetee to Hurdwar, seeing that with capital, care, and trouble, a carriage-road might be made, with an inclination of little more than twenty-five feet per mile, along the banks of the Aluknunda and Dowli rivers to Neetee, the frontier town in the British Himalayas, and by it hackeries could travel almost to the limit of perpetual snow. Along the line of road proposed, the rocks, too, are generally of a soft nature, and easily worked; consisting principally of sandstone and clay, and mica slates. Towards Josimuth vast masses of large granular granites occur, which are again succeeded by slates which continue on to Neetee, and which, beyond Goulding, are succeeded by limestone abounding with belemnites. This fossiliferous limestone forms the great Neetee pass, in altitude 16,800 feet.

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* At Mooltan a branched Palm occurs, which is probably identical with the species met with in Egypt.

On leaving Goojrat and proceeding to the north-west, we pass over an undulating, and in many places low lying country, richly cultivated, and about four miles from the Jhelum, near Mookerian, first meet with hilly land, a spur of the Salt range, consisting of sandstones, clays, and red marls, with a considerable dip (15° to 20°) to the east-south-east. Through this small range the road runs for about six or seven miles over a bold raviney country, devoid of cultivation. We then descend gradually to the Jhelum, and, as we leave the sandstone ridge, get into fine wheat cultivation. This magnificent tract of cultivation extends for about forty miles along the Jhelum, and so rich is it as to allow the Zemindars to get three cuttings of green fodder prior to allowing it to come into ear. Across the river Jhelum, and opposite the town of that name, there is a swing bridge, consisting of three boats held together by strong hawsers. The river, in the cold weather, is about one hundred yards broad. Crossing the Jhelum we enter the Sind Sagur Doab, comparatively speaking a poor Doab, when compared to the others, with, here and there, some fine cultivation. In this Doab the water is generally at a distance from the surface : in many places, as at Manikyala, at one hundred feet. The staple article of the Khureef crop is Bajra (Holcus spicatus) and Mucki, or Indian Corn (Zea mays), and of the Rubbee, Torea, Tirra, and Wheat. The former are cultivated for their oil, which is manufactured on an extensive scale, particularly in the upper and middle portion of this Doab. Running through this Doab we have the Salt range, which gives to it its distinguishing characters. The range has generally a north-east and south-westerly course, and sending out innumerable spurs of low elevation, and seldom rising above 2,500 feet. Near to Jhelum there is one mountain in altitude about 4,000 feet. In form the summits are generally round-backed, conical, or peaked, showing the soft nature of the rocks of which they consist. The middle of the Doab, particularly near Rawulpindee, is well cultivated, but the country raviney in the extreme, great cuts many feet in breadth, and twenty or thirty feet in depth, intersecting the country in all directions. This, too, is a characteristic mark of the Hazara country, and so much do ravines prevail, as to render it necessary to make a detour of several miles, the road being winding in the extreme, in order to avoid them.

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* Annually small quantities of shawl-wool are brought for sale to the Bagheaur fair.

The country of the Salt range may, in general, be characterised as barren in the extreme, with, here and there, rich valleys. The hills are unfitted for cultivation of any kind, owing to their dry sterile character, and even grasses grow with difficulty. Species of Salsola and Achyranthes prevail, and towards the middle and upper portion of the Doab, the Cowzeitun, or wild Olive (Olea ?), a species of Dodonæa, and the Orthanthera viminea are characteristic of the hilly country. In the ravines and beds of small streams, the Oleander and Nerium odorum are common. In similar localities it occurs in the Swalik range, and Dr. Royle* mentions that it is found in water-courses in Syria, Egypt, and Barbary, and in the south of Spain. In the Himalayas the same species occurs to an altitude of 6,000 feet. The commonest shrubs of the open country are the Celastrus spinosus, Justicia adhatoda, and the Mimosa albispina, a mere variety of Acacia arabica, and so named on account of its white spines by Griffith. Associated with those plants we find the following :—

Asparagus.
Barleria.
Dalbergia Sissoo.
Zizyphus Napeca.†
Euphorbia.
Carissa villosa.
Justicia paniculata.
Juncus.
Randia dumetorum.
Vallaris pergulana.
Zizyphus vulgaris.
Acacia modesta.
Phyllanthus.
Buddleia Neemda.
Achyranthes villosissima.
Astragalus (Caragana) spinosissimus.
Fagonia mysorensis.
Medicago.
Jasminum grandiflorum.

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* Royle's *Illustrations*.

† The leaves and fruit are extensively collected to feed cattle, and it is said that cows so fed give rich milk. By Sir H. Elliot it has been identified with the famous fruit of the Lotophagi. (Howd. iv. p. 177), *Supp. Gloss.* by H. M. Elliot.

Urtica salicifolia.
Chenopodium album.
Grewia oppositifolia.
Hoya viridiflora.
Peganum Harmala.
Eriophorum canabinum.
Evolvulus niveus.
Cynoglossum.
Euphorbia.
Barleria hirsuta.
Melilotus.
Bombax heptaphyllum.

Here too the Gisekia pharnaceoides, a plant also found growing in Egypt, is common.

Calotropis Hamiltonii.
Anthericum indicum.
Brassica erucastrum (Tirra), extensively cultivated.
Cissampelos hirsuta.
Capparis aphylla.
Antidesma diandra.
„ indica.
Melia Bukain, a few near villages.
Solanum Jacquini.
Cordia Myxa.
Euphorbia parviflora.
Ficus indica, near wells.
Sinapis glauca (Torea), cultivated extensively.
Phœnix sylvestris, a few trees.
Butea frondosa (pubescens, *Griffith*).

The last is said by Griffith to be the Chuckra of natives, used in making paper; this is surely a mistake. The bark of the roots is used for matches, but nowhere is paper made from it, as far as we could learn, and we made many inquiries. Acacia dumosa is very abundant and dwarfish.

In this Doab the Prosopis spicigera disappears, and its place is taken by the white-thorned Mimosa and the Celastrus spinosus. The Phulahi (Acacia dumosa) is common, but dwarfish. The Orthanthera viminea, which is also common at the foot of the hills in the Deyrah Dhoon, and whose fibres are well adapted for making ropes, is also very common, particularly amongst the deep rocky ravines. In this Doab we first meet with the Astragalus (Caragana) spinosissimus, a plant abundant in Cashmere. The Cowzeitun, or wild Olive, is, too, first met with after leaving Rawulpindee, amongst the limestone rocks near Junee-Ke-Sung. Here it forms low trees, and covers the surrounding hills, and associated with it a Dodonæa, a species quite distinct from the Dodonæa Burmanniana of southern India. Proceeding to the northwards towards Hazara, we pass over a dry clayey country, intersected in all directions with ravines, but which, as we approach Kurreepore, becomes more fertile and irrigated. Here the most important cultivation is Sugar-cane, owing to the fine irrigation afforded by the Dore river, the sugar being manufactured for exportation to Cabul; an inferior kind of Cotton is cultivated in small quantity for home consumption. In Upper Hazara the Cow or Zeitun-tree is very abundant, and of considerable dimensions; several trees measured being upwards of eight feet in diameter, three feet from the ground. Associated with it, we find a vegetation very similar to that of the Deyrah Dhoon. The soil, too, is filled with round stones or boulders. The country generally is cultivated, but little land lying waste, and the population appears to be dense. Here the Tea plant might be introduced with advantage. The following are some of the plants met with in Upper Hazara at Dumtour:—

Acacia Catechu.
Vitex acuminata.
Rubus floribundus.
Solanum verbascifolium.
Orthanthera viminea.
Alisma.
Salix babylonica.
Berberis asiatica.
Rottlera tinctoria.
Hedera Helix.
Asparagus.
Grewia oppositifolia.
Cissampelos hirsuta.
„ tomentosa.
Phyllanthus.
Urtica salicifolia.
Nerium odorum.
Justicia paniculata
Randia dumetorum.
Vallaris pergulana
Olea ? Cowzeitun.
Rosa Lyellii.
„ floribunda.
Bombax heptaphyllum.
Dodonæa.
Ficus cordata.
Indigofera.
Ficus indica.
Justicia Adhatoda.
Barleria.
Melia Bukain.
Celastrus speciosus.
Acacia modesta.
„ speciosa.
„ Serissa.
Dalbergia Sissoo.
Zizyphus Napeca.
„ vulgaris.
Morus alba.
„ atro-purpurea.
„ grandiflora.

In Hazara the Dore river is extensively used in irrigation, Cutcha canals crossing the upper portion of the valley in all directions; the soil is very rich, consisting in many places of a fine rich black loam. All the hills are more or less clad with the Cheer (Pinus longifolia), and on the higher ranges the Deodar (Cedrus Deodara) and Morinda (Abies Smithiana) abound. Though the general character of the Salt range is barrenness, yet in this Doab we meet with much fine cultivation, particularly near the rivers. Close to the Indus lies the Chuch valley, one of the finest cultivated plains to be met with in the country. To the fertilising properties of the residue of the waters of the river deposited after floods, in a great measure is the richness in many localities owing. Nowhere in India is manure more sparingly used than in the Punjab, and the reason is because the Zemindars are obliged to use all the manure procured from their cattle for the purposes of household economy. In every Doab, wood is scarce in the extreme, all that is required for architectural purposes being brought down the rivers from the Kohistan. For burning, the roots of the Dawk (Butea frondosa) are dug up, dried and sent to Lahore and Amritsir. In other quarters, at a distance from the jungles, or in the upper parts of most of the Doabs, that which ought to go to the support of the soil, the manure of cattle is dried and used; and we can assert, that throughout the length and breadth of this fine country, a few hundred good timber-trees are not to be met with. Formerly in Hazara fine forests of Sissoo existed, but these during the hard times of the former reign, were nearly all cut down by the ruthless hands of the conquerors, and the few left swept away by the waters of the Indus during the great débouche, in 1840.

To supply the demand for wood for burning purposes, which will ere long be immense, is a subject worthy of consideration on the part of government. In almost every Doab there are tracts lying waste which could with a little trouble and labour be formed into nurseries, from whence the Zemindars might be gradually induced to take trees to plant out. At every Thannah a small nursery of a few Beegus of land might be formed, and might be worked with prison labour, under the guidance of Mallees, and one would be sufficient to take charge of two or three nurseries, as it would not always be necessary for him to be present in one place. In addition to the value of rearing timber for burning purposes, the country would be greatly benefited, provided that planting was carried on, on an extensive scale, by the additional moisture, which it is well-known, trees attract. But to bring about this, planting would require to be carried out on a most comprehensive system. It is a well-known fact that districts marked for their moisture have, when cleared of trees, become comparatively dry and arid; and others again, when planted, comparatively moist. By extensive planting in the Punjab two objects would therefore be gained; when the canals, now about to be dug, are commenced on, small nurseries ought to be formed every five or ten miles, from whence young trees could be procured to plant their banks. This being done, it would well repay the amount laid out in the increasing value of the wood, to appoint a person or persons to superintend the pruning and thinning of the trees. That this has not been done on the Doab canals, is much to be regretted, seeing that a great quantity of the wood there growing is now only useful as firewood, owing to the trees being allowed to grow so close to each other. A third of the trees now growing on the banks of that canal might be cut down with great advantage to the others; and the sooner that this is done the better. The canal forests have been valued at many lacs of rupees; and are, therefore, well worthy of more attention than they now receive. We do not state this to the discredit of the canal officers. On the contrary, their exertions in planting the banks of their canals with wood is highly to be commended. No one has done more than Colonel Cautley. But, to look after those works properly, mark out new lines of irrigation, &c., occupies fully their time and attention. For the forests on the canals therefore a regular forester, a man who is thoroughly acquainted with the method of pruning, and thinning timber, ought to be appointed. That immediate return would, no doubt, not be exhibited, is evident, but the expense would be amply repaid by the increasing value of the timber.

The following list will show the timber-trees that are adapted for the climate of the Punjab, some at present growing there, and others that might be introduced with advantage. Some trees grow readily from seeds, others from cuttings, and others send out suckers in such vast numbers as to render cuttings unnecessary. Nor is the timber thus raised much inferior. I shall therefore briefly notice the manner in which each kind of timber-tree is raised, quality of the wood, &c.; as such remarks will be useful to the local officers desirous of introducing them into their districts.

Gen. Acacia.

A. speciosa. Serris.—Grows to a height of from forty to fifty feet, and very rapidly. Inner wood, dark reddish-brown, and very hard; outer wood, white and very soft, and liable to be attacked by insects. Owing to its rapidity of growth and immense foliage, this tree is well fitted to plant on the road-sides to give shade, and as a nursery wood for burning.

Time of sowing seeds.—As soon after they are ripe as possible, though seeds kept for months will germinate. Before sowing the beds ought to be well trenched and manured.

A. elata. Sirsee or Dhoon Serris.—This tree attains to a great height in the dense forests of the Deyrah Dhoon, being met with sixty and eighty feet high, and with a bole of sixteen feet, three feet from the ground. It grows with great rapidity, and much straighter than the former. Its uses are the same. The white wood of this tree and the common Serris are very liable to dry-rot. Grown from seeds.

A. Catechu. Kheir.—Centre wood dark and very tough; from it the Catechu of commerce is obtained. Seeds. A handsome shady tree.

A. nagporensis.—A rapid growing tree, but with soft outer wood, and from its heavy foliage easily broken by strong winds. It is, however, from its rapidity of growth very valuable as a timber-tree. Seeds.

A. arabica. Keekur.—One of the best woods met in the Upper Provinces, owing to its toughness. It, however, is very heavy. For making tent-pegs and carriage-spokes it is preferred to any other kind of wood found in Upper India, and is extensively used by Dr. Patton in making the wheels for the Gort Mail-cart. In the Dhoons, on the banks of the Doab Canal, and in the Baree Doab, magnificent Keekurs are to be met with. Two kinds occur, viz., the straight-growing variety, resembling the Cypress, which is abundant near Moukerian, and the branched variety with crooked bole. Seeds.

A. dumosa. Phulalu.—A useful tree for its timber, and much used in the Punjab in making ploughs, carts, &c. Seeds. It grows well in dry sandy soils, and ought, therefore, to be extensively cultivated.

Gen. Bauhinia.

B. variegata. Kotchnar—B. purpurea. Kyrewal—B. parviflora. Jingora—B. virgata.—The above-mentioned species of Bauhinia are all ornamental timber-trees, and raised from seeds. From the B. emarginata, Teu Ke-Gond is extensively gathered, particularly in the Deyrah Dhoon and lower hills.

Gen. Tamarindus.

T. Indica. Emlee.—Lofty tree. Seeds.

Gen. Gleditschia.

G. ferox.—Large timber-tree. Seeds.

Gen. Ceratonia.

C. siliqua. Karof.—Seeds are eaten and relished by cattle, and have been imported into England with profit, and used as an oil-cake. *(Lindley.)* The plant is a native of Europe and Syria, and has been imported into Saharunpoor, where it grows luxuriantly. Seeds. None of the plants have ripened their seeds at Saharunpoor.

Gen. Prosopis.

P. Spicigera. Shoud.—Well adapted for dry tracts; grows to a very handsome shady tree. Seeds.

Gen. Cathartocarpus.

C. fistula Ambultas.—A handsome and showy tree, useful for its timber as firewood. Seeds.

Gen. Cassia, *Lin.*

C. sumatrana.—A fine timber-tree. Seeds.

C. arborea.—Grows to a height of forty feet, and useful, owing to its rapid growth, as a timber for firewood. Seeds.

Gen. Pongamia.

P. glabra. Paphri.—This is a very valuable tree, owing to its umbrageous foliage, and the hard close-grained nature of its wood, which is as compact as box. It does not grow to a very great height, the branches being thrown out laterally. Seeds. The seeds ought to be sown as soon after they are taken off the tree as possible.

Gen. Dalbergia.

D. Sissoo. Sissum.—This is one of the most useful trees in the North-west Provinces and Punjab, owing to its rapidity of growth and toughness of its inner wood. For spokes and naves of wheels it is generally used by the agricultural classes, but the outer, or external wood, is very liable to dry-rot: its inner wood is, generally, of a dark-brown colour. This timber-tree used to abound in the Deyrah Dhoon, but all the finer timbers have been exhausted. For building, and all architectural purposes, it is admirably adapted, and ought to be extensively cultivated on the waste lands. It is grown from seeds.

D. robusta.—This is also a valuable timber tree and of rapid growth. Seeds.

D. Ougeinensis. Geindun.—Grown from seeds.

Gen. Erythrina.

E. stricta. Doul Dawk.—A lofty timber-tree, useful as fire-wood. Seeds.

Gen. Butea.

B. frondosa. Dawk.—Useful as firewood. Seeds and cuttings.

Gen. Cordia.

C. Myxa. Lissora.—Seeds or cuttings.

Gen. Bombax.

B. heptaphyllum Semull or Cotton Tree.—This tree grows to great dimensions. One at Teeree in Garwall being thirty feet in circumference including buttresses, three feet from the ground, and eighty feet high. Its wood is useful for burning, and where lightness is required; it being very light, soft and open in the grain. In growth it is rapid. Seeds.

Gen. Sterculia.

S. coccinea. Khundalla—S. villosa. Ghundana.—Both species are lofty trees, and easily raised from cuttings and seeds.

Gen. Tectona.

T. grandis. Sagoon.—The Teak is not only one of the hardest and best timber-trees known in the vegetable kingdom, but is also distinguished for its rapidity of growth. It was introduced by Mr. H. Vansittart into the Jullunder, where it is thriving well. In sowing the seeds a very shady place ought to be selected. If sown in the sun they will not germinate.

Gen. Gmelina.

G. arborea. Koowar.—A lofty and rapid-growing tree, and distinguished for its hard close-grained white wood. Seeds.

Gen. Bignonia.

B. suberosa.—A rapid-growing and lofty tree, easily reared from suckers or cuttings. It does not give seeds in the Saharunpore Garden. In the cold weather it flowers, presenting a very fine appearance. Its wood is soft and open-grained, and only fitted for burning, or where light wood is required.

Gen. Lagerstrœmia.

L. regina. Kaurie—L. parviflora. Adwaine.—Both trees grown from seeds, which require to be sown immediately after they are ripe and taken from the trees. The first is (the Amherstia and Asoca excepted) the finest flowering timber-tree in India, its great panicles of purple flowers presenting a fine appearance in the hot weather during the months of April and May.

Gen. Grewia.

G. oppositifolia. Bahul—G. elastica. Daunoo—G. lanceolata. Kareenkh—G. dulcis. Fulsa Lukree—All grown from seeds, which require to be sown immediately after they ripen, and affording good wood.

Gen. Pterospermum.

P. acerifolium, P. lanceæfolium, P. semisagittatum.—All grown from seeds.

Gen. Kydia.

K. calycina. Poola. Seeds.

Gen. Bassia.

B. latifolia. Mowah.—Grown from seeds. From the flower a kind of arrack is distilled.

B. butyracea.—Worthy of introduction into the Kohistan for the oily principle which is yielded by its seeds.

Gen. Mimusops.

M. Elengi. Mowlseree—M. Kauki. Kirnie.—Both grown from seeds, which as soon as ripe require to be put into the ground. These trees are valued for their fruits by natives.

Gen. Terminalia.

T. Bellerica. Baihara—T. chebula. Hurrh.—Grown from seeds.

Gen. Pentaptera.

P. tomentosa—Sym.—Grown from cuttings.

Gen. Rottlera.

R. tinctoria. Roonia.—Grown from seeds as soon as ripe. From the seeds a red powder used in drying is procured, being brushed off them when ripe.

Gen. Phyllanthus.

P. Emblica. Awola.—From seeds. This is a highly ornamental tree, and grows to a great size.

Gen. Nageia.

N. Jeapota. Jeapota.—Seeds.

Gen. Ehretia.

E. aspera. Chumroo.—Grown from seeds. Wood very hard and compact, and used in making ploughs, &c.

Gen. Salvadora.

S. persica. Shal or Peeloo.—Seeds.

Gen. Artocarpus, *Lin.*

A. integrifolia. Kutha or Jack—A. heterophylla. Burhul.—Considerable sized trees, grown for their fruit. On the seeds ripening, it is necessary to place them immediately in the ground.

Gen. Nauclea.

N. cordifolia. Huldoo—N. parviflora. Khyme.—Both grown from cuttings; very lofty trees, and wood useful for burning. Grows rapidly.

Gen. Toona.

T. vulgaris. Toon.—Wood good, and well adapted for household furniture; grown from seeds.

Gen. Melia.

M. Azadirachta. Neem—M. Bokhyan-Bokhyan.—Raised from seeds; the leaves of the first medicinal.

Gen.. Mangifera.

M. indica. Amb.—Seeds to be sown as soon as ripe.

Gen. Spondias.

S. Magnifera. Ambaru.—Grown from seeds and cuttings.

Gen. Moringa.

M. pterygosperma. Sahoujna.—Horse-radish. Tree so named from its roots tasting very like that vegetable, and for which it is an excellent substitute, Grown from seeds.

Gen. Platanus.

P. orientalis. Chunur.—A noble timber-tree which might with advantage be introduced into the Kohistan. It abounds in Cashmeer, and grows well from cuttings.

Gen. Sapindus.

S. saponaria. Reeta.—The seeds of this tree used as soap. It is necessary to sow them immediately after ripening, or they will not germinate.

Gen. Melicocca.

M. trijuga.—Suckers and cuttings.

Gen. Pavia.

P. indica. Kaerom.—Seeds immediately on ripening.

Gen. Tetranthera, *Jacq.*

T. monopetala—*T. apetala.*—Both from cuttings and seeds.

Gen. Ægle.

A. marmelos. Bale.—Grown from seeds.

Gen. Feronia.

F. elephantum. Khyte.—Grown from seeds.

Gen. Salix.

S. babylonica. Mujnoo.—Cuttings.

Gen. Casuarina.

C. muricata.—Grown from seeds, which require to be sown in a shady place. For most places in the Punjab this tree is admirably adapted, as it grows well in a sandy and light soil, and as it affords very tough and long-fibred wood, it is well worthy of attention. So hard is it that carpenters object to use their instruments with it. It, too, grows rapidly. There are some trees in the Saharunpore Garden planted six years ago, now about fifty feet high.

Gen. Shorea.

S. robusta. Saul.—This is a most important tree for architectural purposes in upper India. It is grown from seeds, and if these are not put into the ground shortly after ripening, they will not vegetate. In sowing them it is necessary to be careful not to put them more than half-an-inch into the ground. On the Doab canal an attempt was made to grow them, but failed owing to the seeds being either too old or too much buried.

Gen. Morus. *Foot Tootri.*—All the species of Morus (Mulberries) easily strike by cuttings, and any quantity can be thus raised.

Gen. Ficus.

F. indica. Burr—*F. religiosa. Pepul*—*F. venosa.*—*Pilkhum*—*F. elastica.*—*India-rubber Tree*—*F. glomerata. Goolur*—*F. lucida.*—Most of the Fig tribe are easily grown from cuttings, and are highly useful in affording forage for camels, &c., and a good shade. For the first-mentioned purpose they are well worthy of being extensively introduced into the Punjab.

This list might be greatly enlarged, but I have only mentioned here such species as will certainly succeed in the Punjab. There are, in the upper and lower portions of the Doabs, we have no doubt, very different climates. But, generally speaking, unless on the very borders of the desert, the species here enumerated will succeed, provided that they are properly sown. Before sowing the seeds the land ought to be well trenched or ploughed, and then strongly manured, or at the rate of from three to four hundred maunds per acre. Frequently seeds do not germinate owing to the bad condition of the soil, and this in a new country like the Punjab (where so much waste arid land exists, and which will no doubt be selected as sites for forming plantations) requires to be particularly guarded against. Since writing the above, the admirable Minute of the Governor-general on the state of the timber cultivation in the Punjab has been published In it almost every topic worthy of observation connected with the growth. of timber in the newly-acquired territory has been adverted to, and ably discussed; and the plan recommended for its extension is so excellent, as, if properly carried out by the district officers, must ultimately be attended with the greatest success. The Agri-Horticultural Society, too, has been established, and has already commenced operations in a vigorous manner. With its able president, active and energetic secretary, and a host of talented members, it cannot but be the means of conferring the most lasting benefits on the country of the Five waters. Nowhere could a society having as its object the improvement of the agricultural and horticultural resources of a country, have selected a finer field for operations than that of the Punjab, seeing that in it we have the greatest capabilities presented in rich soil, vast waste tracts, ample means of irrigation, and a pliant hard-working agricultural population. Of cultivation, finer examples could not be met with than in the upper parts the Baree and Retcha Doabs, the country from Sealkote to Denanuggur *viâ* Zufferwal Noor-Ke-Kote, and Sehdial, being one field of the richest vegetation, proving the good characters of the natives as agriculturists, and the richness of the soil. But to examine this tract of country, a good rainy season must be selected, as on the elements the Zemindars entirely depend for water for their crops. We have traversed at all seasons of the year most of the finer portions of the North-western Provinces, but nowhere have we seen better and cleaner cultivation, and finer crops than in the tracts above-mentioned.

We have stated that, in proceeding to the north from Lahore, no rocks are met with *in situ* until we met the Salt range. Forming the northern boundary of the Jullunder, and other Doabs, we find a series of small ranges of hills, composed of sand, sandstone, conglomerate, and marls. These low ranges form the Kohistan of the Punjab, and may be considered as a mere continuation of the Sevalick range, met with between the Ganges and Jumna. Here, before reaching the range, we have to pass through a dense grass jungle thickly studded with trees. Not so in the Jullunder Doab ; here no jungle exists ; scarcely a tree, comparatively speaking, is to be seen even to the base of the hills. The hills themselves, rising to a height of from five to fifteen hundred feet above the level of the sea, are like the Sevalicks, bare and barren in the extreme, with, here and there, some dwarf Cheers (Pinus longifolia), Bastard Toon (Cedrela Ougeinensis), and other trees. Proceeding from Hooshiarpore to the north towards Kangra, we, after a march of about four miles, reach the first range of hills, and traverse it by a winding course through the bed of a small stream. This range is styled the Pamrai range, and is about six miles in breadth. In crossing it by a tedious winding course through the bed of a nullah, containing but little water, we find numerous sections illustrating the nature of the formation of which the range consists. The range consists of beds of sand and sandstone, with boulders embedded and mixed up with red and green marls, showing that it has been formed from the decomposition of the older rocks on which it is found to rest. Here and there, masses of sand stone, much harder than the surrounding sand and conglomerate, stand out in bold relief, forming various grotesque appearances. On crossing the range, we enter the Juswunt valley, through which a small fordable stream runs ; in this valley there is some good cultivation. In breadth it is about two to five miles, and forty miles in length. Following the road to Kangra, the encamping ground is at Amb, a native garden, now a jungle ; in it there are some noble Cypress (Cupressus sempervirens) and Plane (Platanus orientalis) trees ; shortly after Amb, and proceeding northward, we reach the Juswunt range, a range of hills seldom rising higher than 1,200 feet ; it forms the northern boundary of the Juswunt valley, and is much more covered with vegetation than the Pamrai range ; Cheers, Sauls (Shorea robusta), and Toons, being abundant, and brushwood, consisting of a species of Dodonæa, Karunda (Carissa villosa), and Justicia adhatoda. The road through this range runs in the course of a stream, rendering it difficult to traverse during the rains. After proceeding some six miles by a winding road through small hills of sand and sandstone, with red and green marls, we ascend a ghaut ; the road then crowns the hills, presenting a very barren and dry appearance, cultivation, from want of water, being rare and scanty in the extreme. Descending from the Chumba Ghaut, which may be considered as a portion of this range, we reach the Beyas river, which here is about eighty yards broad, and in depth from eight to twelve feet, with water of a fine clear green colour. The ferry is crossed by a large flat-bottomed boat. The sand-stone strata are well exposed on the banks of the river, dipping to the west and south, under an angle of 45°. The Ghaut is about eighty feet above the bed of the river, and covered with boulders, which are highly rounded and polished, showing that the river formerly flowed there. These boulders are found embedded in clay, which rests unconformably on the sand-stones and marls. On crossing the river, we enter another valley, styled the Jowala Mookee valley, so named from the famed temple here situated. This valley is in many places covered with innumerable boulders of quartz rock, particularly near the banks of the river, but at an elevation of eighty and one hundred feet above the present level, showing how much its course had been altered. The Jowala Mookee valley is a fine open undulating plain, varying in breadth from eight to ten miles, and in length about fifty miles. To the north it has at its boundary the Jowala range of mountains, and is intersected in various places by small spurs, which issue from it, or small isolated hills. It is highly cultivated, presenting in many places fine sheets of the richest vegitation. Distant from the river, and over a magnificent undulating road, which attests the energy and activity of the present able magistrate, Mr. G. Barnes, is the far-famed Jowala Mookee, with its temple perched on the side of a mountain, at an altitude of about 200 feet, and the mountain itself rising to a height of about 1,200 feet above it. The rocks consist of sandstone, and red and green marls, from which numerous springs issue, and some of them being saline are much and successfully used in the treatment of *Goître*, probably owing to the iodine they contain.*

Here, too, carburetted hydrogen in the form of three or four small white flames issues from the sandstone rocks, and in this locality the famed temple is built. By the Hindoo pilgrims these gas springs are adored with the greatest veneration, and by the attendant Brahmins are daily fed with loads of Ghee. If a person of rank visits the temple and gives a handsome present, the jets are made to burn with increased vigour, by removing plugs, and thus increasing the size of the holes through which the gas escapes, and he is informed by the priests that his present has been acceptable to the Deity, his approbation being expressed by the brilliancy of the flames. The poor bigot leaves the temple highly satisfied, and with a light heart, but empty purse. In this manner the minds of pilgrims are worked upon by the wily Brahmins, and large sums annually collected by them. Gas springs are common in many places in Europe and America. Mr. Vanuxem states that the presence of carburetted hydrogen gas on the upper part of the Ohio river is considered a sure indication of the presence of salt water. At Fridonia in Chaulangue county, America, the gas is collected by means of a shaft sunk in bituminous shale, and conveyed by a tube to a gasometer, and from thence for the purpose of illumination to different parts of the village. In a similar manner the gas at Jowala Mookee might be usefully employed in lighting the streets of the town.

The following table points out the temperature of the salt and other springs met with in the Punjab and Himalayas, and the rocks from whence they issue :—

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* See Moorcroft's Travels.

TABLE OF SPRINGS MET WITH IN THE HIMALAYAS, PUNJAB, AND KOHISTAN.

Locality of Spring.	Rock.	Temperature.		Altitude.	Hour of observation	Remarks.
		Air	Spring			
Salt mine of Durang in Mundi	Sandstone and marl	58	61	2,200	8 A.M.	
Spring on the banks of the Beyas, 3 miles from Durang	Sandstone	60	50	2,000	,,	Saline
Vingal Kenulla	Red marl	,,	47	2,200	10 A.M	A small salt stream, whose waters run into the Beyas This stream propels several mills for grinding corn.
Spring on the banks of the Beyas, 3 miles from Mundi	Small granular granite	62	68	2,000	Noon.	To the hand the water felt a little warm.
Spring on the banks of the Beyas, 1 mile further, or 2 miles from Mundi	Granite	,,	68½	..	,,	A bowli
Spring a mile from Peepul Kote	Limestone	72	64	..	..	
Spring near the village of Paeki .. .	,, ...	88	85	..	..	
Spring at Peepul Kote	Quartz rock	66	88	..	..	At Hilung, 4 miles further on, the thermometer, when exposed to the sun, rose to 113 at 4 P. M
Spring 4½ miles from Budrinath	Small granular granite	,,	42	9,000	8 A.M	
Spring at Budrinath, ...	Granite	37	125	9,900	6 A.M	
Spring 30 yards distance	,, ...	,,	79	..	..	
Spring 40 yards distance	,, ...	,,	50	..	..	
Stream running into the river close to Budrinath	,, ...	42	38	9,900	6 A.M	
Spring 110 yards from the Temple of Budrinath	,, ...	,,	36	..	,,	
Spring near the river	,, ...	,,	42	..	,,	
River close to the Temple	,, ...	,,	37	..	,,	

Table of Springs met with in the Himalayas, Punjab, and Kohistan.—(Continued.)

1st spring ¼ of a mile beyond Tuppubund ..	Quartz	56	98	7,000	8 A.M	
2nd spring	"	"	90	..	"	
3rd spring	"	"	126*	..	"	
Spring 300 yards further on, running into the river Dowlia	"	"	50	..	"	
Stream ¼ of a mile further beyond the former	"	"	66	..		
Spring ¼ of a mile further	"	"	71	..	"	
Spring at Mulaie	Clay slate	54	52	..	"	Chalybeate.
Spring at Goting	"	45	36	12,100	7 A.M.	
Spring on the bed of a river near Goting .	"	"	41	..	"	River temp. 37; water very dirty, of a greyish-white colour. Spring clear as crystal.
Juma	Gneiss	60	54	..	"	Near the tomb? (Jahangir, according to Baron Hugel.) This spring gushes out in several places from a limestone-rock, forming a small river, which supplies the town of Husn Abdal with water, and in which thousands of fish occur, which are daily fed by fakirs or holy men.
Husn Abdal	Compact limestone	"	70	1,500	Noon	
Husn Abdal	Limestone	"	68	..	"	
Spring at Kote in Huzarah	Alluvium	41	47	..	7 A.M.	
Wah, 2 miles from Husn Abdal, 1st spring	Compact limestone	"	71	..	"	Limestone strata, highly inclined and dip under an angle of 45 degrees. E.N. here several springs issue from the limestone-rock, all of an uniform temperature of 71
.. " " 2nd spring	"	"	"	..	"	
" " " 3rd spring	"	"	"	..	,	
Spring at Kulu-Ke-Kuttee	Sandstone	57	67	2,670	6 A.M	
Spring at Kohat	Fossiliferous limestone	34	84	..	"	

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* Hot springs also occur at Jumnoutri and Gungantri, in Gurwall, which are noted as places of pilgrimages. At Manikaun, in Kooloo, hot springs issue from quartz rock. Invariably where hot springs occur in the Himalayas or Kohistan there plutonian rocks are met with, and if neptunian rocks do occur, they are always much altered, showing their connection with plutonian agency. From Chinese Tartary pisiform limestone, in small specimens, is frequently brought to Almorah by the Bhotiahs, probably collected in the neighbourhood of gaseous springs which there exist. By the Bhotiahs, Mr. Batten informs me, the springs are said to occur in the bed of the Sutlej, in Thibet.

Turning the Jowala Mookee range at Ranee-ke-Tal, we proceed by an undulating, hilly, but good road to Kote Kangra, distant about fifteen miles. The town and far-famed fort of Kangra are situated on a small range of hills of conglomerate which rises to a height of some six hundred feet above the river Ban Gunga. The conglomerate dips under an angle of 15° to the east of north, and belongs to the medial-tertiary series.

The Kangra valley is about fifty miles long and ten miles broad, and divided into three parts: the western, or Valley of Rilloo; middle, Kangra; and the eastern, or Pahlum, separated from each other by spurs of mountains, with highly undulated, and richly cultivated plains dipping to the south and west, and with fine natural irrigation derived from innumerable streams which come from the Chumba range of mountains, which forms its northern boundary. This lovely valley, as, properly speaking, it forms but one valley, is admirably adapted for Tea cultivation, nearly throughout its length and breadth. At Holta there is a magnificent and gently inclined plane lying waste, and well adapted for Tea cultivation, and commanded by two considerable rivers, the Cura and the Nigul. At Nugrotah and Bobarnah, in the eastern part of the valley, two small Tea nurseries have been formed, and though the seedling plants were only planted two years ago, and not a particle of manure given to them, they are now between four and five feet in height, showing how admirably this valley is adapted to this purpose. Irrigation, too, to any extent is procurable.

Strewed over the valley, particularly the eastern portion which is highly terraced, vast boulders of granite occur, some of them upwards of a hundred feet in diameter, of a greyish white colour, and containing large crystals of white felspar, many of them six inches in length. This mineral appears, owing to the potash which it contains, to be easily decomposed, and possibly to the presence of this alkali the richness of the soil is in a great measure owing. The abundance of these boulders everywhere throughout this valley is highly characteristic. Numbers of streams are to be met with coming from the Chumba range, from which artificial irrigation-canals have been made by the inhabitants to irrigate their fields, and, though the fall is very great, the water rushing with the force of a mountain torrent, and though these canals have been running for more than one hundred and fifty years,* yet, owing to their boulders which form the substratum, the levels have not been altered. Nowhere does the soil occur above a few feet deep, and on digging it is found to rest on the boulder formation.

The town of Kangra, situated in the middle and southern side of the valley, is elevated about 3,000 feet, on the same altitude as Nugrotah, where the Tea nursery is formed; Bobarnah is 4,000. Here the Tea-plant is thriving equally luxuriantly as at the former-mentioned place. Holta, which we have selected as a site for a Tea plantation, is a fine open and gently inclined

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* See Barnes on the system of irrigation prevailing throughout the Kangra valley.

(with a southern exposure) waste plain, of about four to five miles in length; and in altitude from 4,000 to 5,000 feet, and commanded by, as already stated two considerable-sized rivers. The soil consists of a thin stratum of black mould, with a subsoil of a stiff but friable reddish clay, resting on boulders. Throughout this fine valley there are many tracts of waste land at altitudes varying from 3,000 to 5,000 feet, equally well adapted for Tea cultivation. In the adjoining province of Kooloo, a rugged and bold mountainous country, there are also many places well fitted for the Tea plant. But the Kangra valley, from the facilities of exportation and the advantages of water-communication to Bombay, is second to no place, the road to the plains being adapted for camels and bullocks, most of the grain there grown being thus exported. It has been asserted that Tea could not be cultivated on a sufficiently extensive scale in the North-western Provinces and the Kohistan of the Punjab to supply the home market, owing to the want of land. But this is a great mistake. Land there is in abundance in the British hill provinces, and much of it lying waste, and possibly the time is not far distant when this cultivation may be carried into the valley of Cashmeer, and the lower valleys of Hazara, which will be found well adapted for the purpose. In Kumaon and Gurwahl vast quantities of waste land, admirably adapted to Tea cultivation, exist, and all that is wanted is capital to clear the jungles. Major Madden has stated, in his account of Kumaon, that the Zemindars give up their lands for the culture of Tea with difficulty, and that but little waste land exists. The latter assertion is erroneous, but the former, regarding the people of Bheemtal, is true. Not so with others in Gurwahl, and this I give not only on my own authority, but on that of a person* high in rank, who, on a late tour through Kumaon and Gurwahl, found the Zemindars most anxious and willing to undertake the cultivation of the Tea plant, and land to any amount available, provided that the officers in charge of the districts "went the proper way about it." Mr. G. Barnes, the talented deputy-commissioner of the Kohistan, states that 25 per cent. of his districts might most advantageously be cultivated with Tea. The commissioner of Kumaon, too, Mr. Batten, states that land for Tea cultivation is abundant. Thus regarding the district of Katere, he says, "Biejnath, situated on the frontier of Kumaon with Gurwahl, and in the neighbourhood of Budbak Fort, was often, in all probability, the scene of border conflicts and military exactions, and the desertion of villages once having commenced, and no means of restoring the population being at hand, the deterioration of climate originating in the spread of rank vegetation, and the neglect of drainage, &c., may be supposed to have gone on from worse to worse, till finally the heat and moisture were left to perform all their natural ill offices, unchecked by the industry and efforts of man." Viewing, however, the present slight improvement in a hopeful light, *and remembering the less favourable situa-*

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* Mr. Robinson, of the Revenue Board, N. W. Provinces.

tions in which Tea nurseries are thriving, I am of opinion that the district of Kuttoor (Biejnath) would be found the one most deserving of selection for the future spread of Kumaon Tea cultivation. Irrigable unoccupied lands, at between 3,000 and 5,000 feet above the level of the sea, abound on the lower slopes of the hills, while much of the good land in actual possession is occupied by migratory tenants at will, unattached to the soil, in whose place the Pudhans of villages could have no reasonable objection to see profit paying wealthy planting gardeners. The very fact that at the present settlement (which took place before any discussion arose concerning the extension of the Tea experiment), seventeen pottahs of villages were, in Kuttoor, obliged to be made over to non-proprietary moostagirs, or farmers, the richer or less desponding neighbours of the resigning pudhans, shows that available ground was at our disposal. But there, and in Pergunnahs Gungolie, Sher, and Seera, the sole expense of securing the land would have been (and even now in many places would still be,) the wiping off the jumma from the revenue books, probably some paltry sum of less than twenty rupees per annum. Again at p. 342 of his excellent Settlement-report of Gurwahl, he states, " those who look to the spread of the cultivated Tea plant over these mountains as likely to change their financial position to the state altogether, and convert them into treasuries of surplus revenue, may not be far wrong. If this extension of the China herb be at first carried on (in the way I have pointed out in the preceding report) without disturbing present possessions, and thus exciting more than the ordinary and normal native disgust at the novelty, the present generation may yet behold the now jealous occupants of rice and wheat fields, humble applicants for Tea seeds."*

Such, too, is the opinion of the District-officer, Captain Ramsay. This season Mr. Batten informs me that in several districts, though the crops have been immense, yet the Zemindars find difficulty in paying their revenue, as the market is so glutted with the grain it will not pay the carriage.

If proofs were wanting, in order to show the advantages of Tea cultivation throughout the Kohistan and British hill provinces, stronger could not be brought forward than the facts here stated.

Here we have the agricultural population with grain lying on their hands as a perfect drug, and not worth carriage to the available markets, and at the same time complaining that owing to the abundant harvest prevailing throughout the country they cannot pay the revenue. Were the system prevailing in China (according to the statements of Mr. Fortune) introduced into the British Himalayas, viz., a certain quantity of Tea cultivation in each village community, we could no longer hear the above complaints, as for tea-leaves there could always be a ready and remunerative market; moreover, the high rate at which they could be purchased at the manufactories, viz. eight rupees per maund, could admit of their transport by the Zemindars from a great distance, even sixty or seventy miles, with profit. But one of the greatest obstacles to the cultivation of the Tea-plant by Zemindars is the dread that land so occupied will be charged at a higher rate than other produce, or resumed by government. To remove these prejudices, steps are now being taken by the commissioner. Let these once be removed, and the agricultural population*, convinced of the utility of Tea cultivation, and we shall no longer hear that there are no available lands.

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* Batten's Report, page 271.

Crops cultivated in the Kangra valley.—In the Kangra valley, and in the Kohistan of the Punjab, we find the following crops.

The *Khurreef crop*, which is sown from February to April, and reaped in October to December.

- Sanwuck or samuk (Panicum frumentaceum.)
- Cheena or Cheenee, Millet seeds (Panicum miliaceum.)
- Kangeree or Korree (Panicum italicum) (Sorghum vulgare).
- Dhan (Oryza sativa), several varieties; the two marked divisions are those sown in the upper lands, and not watered; and those which are sown in low hot valleys require much irrigation to bring them on. Most of the rice grown is exported to the plains—a third of the valley is devoted to this cultivation.
- Mandooa, or Mundul (Eleusine coracana), three varieties cultivated
- Mukkee, or Chillee; Indian corn or Bhootah (zea, maize). The American variety introduced by me into the hills, is rapidly supplanting the kind of maize formerly cultivated. This maize gives a six-fold return but is long in ripening.
- Eck or Gunnah Komandi (Saccharum officinarum)—a small cane, but abounding in saccharine matter, is cultivated in the Kangra valley.
- Chooa (Amaranthus anardaria; Amaranthus speciosus), two varieties, red and yellow, cultivated in Kooloo, &c.
- Ogul or Buck wheat (Fagopyrum vulgare).
- Baugma (Solanum melongena; Solanum tuberosum).
- Ghweea Gundiale (Colocasia himalensis).
- Koorsanee Pipulli (Capsicum frutescens).
- Huldi nuswar (Curcuma longa).
- Kuddoo (Cucurbita maxima).
- Torai, Tori (Luffa acutangula).
- Kukeera Kukri (Cucumis sativus).
- Gheea Toric (Luffa pentandra).
- Bhut (Soja hispida).
- Koolut (Dolichos uniflorus).
- Oord maha (Phaseolus radiatus).
- Ghooroush (Phaseolus torosus).

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* This season many Zemindars have applied for plants and seeds. For extension there will be upwards of three tons of seeds available.

Moong Dani (Phaseolus mungo).
Udruk (Zingiber officinale).

Rubbee crop.—Sown in October, November, and reaped in April and May.

Wheat (red and white), many varieties, divided into the awned and awnless.
Gehoo—Lal Gehoo or Kunnuck—(Triticum vulgare).
Jou or Barley (Hordeum hexastichon), several varieties.
Welaiti Jou or Joui or Oats (Avena sativa).
Ona Jowar, or Celestial Barley (Hordeum cœleste)—grown at great altitudes along with Phapur emarginatum—
Chunna—Chola—(Cicer arietinum).
Posk (Papaver somniferum), blue and white varieties, abundantly grown in Kooloo, a third of the land being cultivated with it. It is cultivated, and opium prepared for exportation to China, across the passes; and in return, Churrus from Yarkand is imported into India.
Mussoor (Ervum lens).
Grey Pea (Pisum arvense).
Rape (Sinapis erysimoides.)
Burlai Rape (Sinapis ramosa).
Torea (Sinapis dichotoma ?).
Sursoo (Sinapis rugosa).
Burga sursoo (Sinapis glauca ?)

Agricultural Implements.—The agricultural implements used throughout the Punjab are similar to those met with generally in the North-west Provinces. In the Jullunder Doab, to crush the sugar-cane, a mill with wooden rollers, and propelled by a pair of bullocks, is used. The plough in use is very light, and seldom penetrates more than three or four inches into the ground. In Hazara it is even of a smaller and lighter description than that used in the Punjab.

Breed of Cattle.—In all the Doabs the cattle are very small, and generally of a black, brown, and red colour; miserably fed, and thus wretched, scraggy-looking animals, no attention whatever being paid to the breed. Not so, however, with their horses; Seikhs following the example of their late chief, Runjeet Sing, are fond of good horses, and they are (or were) extensively bred in the Sind Sagur Doab, in the district of Dani and Gheb in the Salt range. The horses there raised are, generally, very powerful and enduring, though far from handsome, and during the late campaigns proved their mettle. A few English or Arab stallions might be introduced, to cover the district mares, with advantage. Mules, too, are also extensively bred in the Sind Sagur Doab, and are frequently met with fourteen hands high. For these high prices are asked, ranging from 250 to 450 rupees.

Before entering on the geological structure of the Punjab, &c., we shall make a few observations on the coniferous trees met with in the Kohistan and British Himalayas.

Genus Cedrus.—The cedars are characterised by their numerous linear, acicular, persistent, and tufted leaves, the tufts varying in number from thirty to sixty, and each singly, and without any enveloping sheath, in length one to two inches ; erect, truncated, conical cones, which when ripe are deciduous ; trees, when young, conical in form, but as they advance in age, the upper horizontal branches expand, and give to them a truncated form at summit.

1. *Cedrus Deodara.*—Throughout the Himalayas this species is known under various names.

In Kumaon and Gurwahl it is named Deodar or Deodara, at Simla, Keloo, and in the Kangra country, Deodar or Dear ; and in the Hazara, Diar or Paliptur. The boat-builders on the Jhelum also distinguish it by the latter name.

Throughout the mountains it occurs in vast forests : at Jugissur and Lohooghaut in Kumaon, at Nag Tebba near Mussoorie, at Phagoo and Mahussoo near Simla, at Rashalah in Kooloo, on the Chumba range in Kangra, and on the Pir. At Narkunda, near Koteghur, Deodar-trees are met with, but the finer timbers have been felled by the government agents, and sent to Ferozepore and Bombay. In the Mundi country a small forest exists near Jumah ; this, too, has been thinned of its finest timbers.

Of all coniferous trees met with in the Himalayas, the Deodar is most valued for its durability and wood, which is compact, rather close-grained and long-fibred, highly resinous, and giving a delicious perfume to the air. For both naval and architectural purposes it is admirably adapted, owing to its strength and great durability, it lasting for a number of years even though much exposed to the elements, and being but little affected by water.

On the banks of the Jhelum, Chenab, and Ravi rivers, extensive boat manufacturies exist, and the following are the prices asked :—

For boats completely built of Deodar, 1,400 to 1,500 maunds measure, rupees 1,200 to 1,500.

A boat of 1,400 or 1,500 maunds, outside Deodar, and lined with Cheel, rupees 1,000 to 1,200.

A boat of 400 to 450 maunds, outside Deodar and lined with Cheel, rupees 250 to 300.

A boat built of Deodar will last from twenty to thirty years.

Dimensions.—The Deodar grows to extraordinary dimensions. At Rashulah, in Kooloo, a forest, as already stated, exists, with timbers varying from eighteen to twenty-four and a half feet in girth. The following are the dimensions of some of those measured, four feet from the ground :—

1st Tree, 24 feet.
2nd Tree, 23½ feet.
3rd Tree, 20 feet.
4th Tree, 24 feet.
5th Tree, 19 feet.
6th Tree, 20 feet.
7th Tree, 22 feet.
8th Tree, 20 feet.
9th Tree, 24½ feet.

Growing along with these were some Khursoo Oaks (Quercus semecarpifolia).

On the banks of the Jhelum we measured a timber which was 18 feet in circumference and 60 feet in length.

Near Mulari in Gurwahl, at an elevation of about 11,000 feet above the level of the sea, we measured two trees; one girded twenty-six feet, three feet from the ground, the other twenty-seven feet.

Localities.—We have already noticed some of the localities, but it would be needless to give a longer list. As a general remark, we may state that the Deodar is seldom found growing in a natural state below 6,000 feet of altitude. The finest trees are generally found growing on the north sides of barren mountains in thin poor soils, formed from the decomposition of granite, gneiss mica, or clay slates. Here, too, the character of the wood is different from those grown in southern aspects and in richer soil, it being more compact, harder, and of a deeper red colour. This is well known to the natives, and can easily be accounted for, viz., its slowness of growth. But if this distinction is characteristic in this species, it is much more so in others, which we shall afterwards notice, particularly the Cheer.

Genus PINUS.

Pinus longifolia.—If the Deodar is the characteristic coniferous tree of the middle regions of the Himalayas, the Cheer marks the lower belts, occurring in all intermediate altitudes, from 1,700 to 6,000 feet above the sea level. It is the first tree that strongly reminds the traveller in ascending the Himalayas that he has attained a different climate from that of the scorching plains of Hindostan, and that greets his eye with an European form. Ascending a little higher he meets with Oaks and Rhododendrons, showing that though European Pines are most prevalent, yet others tell that he is still within the tropics, or, rather, nearly so.

The Pinus longifolia is, from its diversity of climate and aspect, known under different names. In Hazara, and on the upper banks of the Jhelum, it is styled Anunder, and throughout Kangra and the eastern hills it is named Cheel or Cheer. Dr. Royle also mentions Gullar, Thansa, and Gurul, and states, on the authority of Colonel Cautley, that there is more than one species known under these names.

There are two varieties, one which has its woody fibres twisted; and therefore by the natives said to be Kutcha, the other in which the fibres are straight. The *Kutcha* trees have the wood of a white colour, and open in the grain; the *Pucka*, reddish white, and compact; but this character is not permanent, as sometimes the wood, though white, is Pucka, and straight fibred. Invariably the reddish white wood is preferred by the natives, and on felling a tree, and on finding this, the remark is, "it is *Khoob Pucka.*" To make lathing this variety alone is adapted, and it is sold under the name of *Dadur*. In felling the Cheer wood for architectural purposes, it is of consequence to ascertain that the variety is the straight-fibred, as the other is so apt to warp and split.

In all places where the Cheer is found growing at an elevation of 5,000 feet and upwards, with a northern aspect, and on poor soil, there the variety is invariably the straight-fibred, and the wood is good; again, in southern localities and lower down, it is twisted in the fibre, and of but little use in architecture. At Hawalbaugh, near Almorah, 4,500 feet above the level of the sea, a forest of Cheer Pine occurs with a westerly exposure, hundreds of the trees being upwards of eighty and ninety feet in length, and eight and twelve feet in girth; but here all the timbers have twisted fibres, and are therefore, useless. Distant from this about three miles to the northward, there are two forests, at about the same elevation, with northern exposure, and growing on poor soils, the *débris* of clay-slate, with all their timbers straight-fibred, and the wood excellent, and from these districts the wood used at the military station of Almorah is supplied.

This opinion regarding the value of sites where Pine trees are grown is not, we are aware in accordance with those of many; but we here give facts, as exhibited in the Himalayas. Matthew, in his treatise on naval timber, states that the Pinus sylvestris, if grown on good or rich soil, attains rapidly large dimensions and its best timber properties.

Uses.—Like the Deodar the Cheer is extensively used for building boats on all the rivers in the Punjab, but particularly at Bhyrowal on the Beyas. Boats built of this wood do not last more than six or seven years. On the other rivers where Deodar is procurable, this kind of wood is extensively used to line the inside of boats.

Cheer wood is extensively cut in the Kangra country on the jagheer of Sirdar Lena Sing Majeeta into timbers twenty feet long, one and a half broad, and six to eight inches thick, and exported, during the rains, by the small river Dipte to the Beyas, from whence they are floated to Bhyrowal.

As already stated, this timber is liable, if exposed to the weather, to rot; but on the other hand, if protected, it is well adapted to building purposes, and is extensively used, particularly in the western hills. I mention this circumstance, as this kind of wood is available in large quantity from the Kohistan of the Punjab, for the stations in the Punjab, Loodiana, Ferozepore, Scinde, &c.

For ship-building and for spars this wood is almost useless, as it resists so badly the corroding effects of the weather, and is so soft.

3. *Pinus Excelsa.*—This species, the Kuel or Koel* of the natives is of more limited occurrence than the former, and it is only met with at much greater altitudes, viz. from 7,000 feet to 13,000 feet. It is characterised by its lengthened tapering, drooping and persistent cones, long, thin and pointed leaves, which occur in bundles of two or three together in the same

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* It is probably the Beir or Banjeir of Hazara.

sheath. In appearance the foliage of this tree is much more open and drooping than that of the Cheer, and in colour of a more lively green, which at once distinguishes it. Towards the latter end of November, the cones shed their seeds, but remain for many months afterwards hanging to the branches.

Uses.—As the wood is very soft, it is seldom used for building purposes when the other kinds are available. It, too, being seldom found in places where it can be used for practical purposes, it is unnecessary to notice it at length here. We may, however, state in reference to its geographical distribution, that it occurs throughout the Himalayas at heights varying from 7,000 to 13,000 feet. At Neetee in Gurwahl, it occurs at the limit of arboreal vegetation; viz. about 13,500 feet, and there it is dwarfish owing to the great altitude. In no locality to our knowledge in the Kohistan* of the Punjab is it met with, though at Khoti in Kooloo it is associated with Khursoo (Quercus semecarpifolia) and Mokoo Oaks (Quercus dilatata).

4. *Pinus Gerardiana.*—In noticing this other species of the Genus Pinus we may be equally brief, as it is but sparingly met with in the British Himalayas. It is characterised by its large conical-shaped, pendulous cone, which contains edible seeds, of nearly an inch in length. By Europeans it is styled the Edible Pine; and its seeds are imported in large quantities into Simla from Kunaour for sale, under the name of Neosa Pine seeds.

In the bazaars of the Punjab, particularly those of the Upper Doabs, it is met with in quantity, under the name of Chilgoza, being imported from Cabul. In the Bazaar of Wuzeerabad we found it associated with Apples, Pears, Pomegranates, Walnuts, Melons, Khubarries, Raisins, Currants, &c, forming, combined, a scene not commonly met with in the north-west.

In the British provinces the only locality known to us where this tree is met with, is between Mulari and Bumpa; where it occurs associated with Deodar and Kuel, Juniper and Cypress. For its fruit this tree is highly prized, but as a timber-tree is not met with of dimensions sufficiently large to be of much use.

Having now noticed all the Pines properly so called met with in the Himalayas, we proceed to the Spruce Firs.

Genus ABIES.

5. *Smithiana.*—Belonging to this genus we have but one species, the Abies Smithiana, one of the most graceful (if not the most so) species of Abietineæ met with in the Himalayas and Kohistan of the Punjab. Who is there, who has travelled even as far as Kotaghur, when passing through the forests of Mahassoo, Hattoo, and Narkunda, who has not admired this elegant tree, towering into the heavens, eighty and a hundred feet, with its graceful weeping branches, affording grateful shade from the effects of a

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* The characters assigned to the Beir or Banjeir of Murrie, by Dr. Fleming, apply to this species. See Report of Agri-Horticultural Society.

noonday's sun. This species throughout the Himalayas is known by various names. In the Simla jurisdiction it is styled Row, Rai, Pindrow, Morinda and Khatrow. In the Kohistan of the Punjab and Kooloo, the two former names are most common. In Kumaon and Gurwahl, Pindrow and Morinda.

It is at once distinguished from any other Himalayan species by its single needle-shaped leaves, varying in length from one to two and a half inches, arranged irregularly around the stem, of a bright green colour; its pendulous branches, the smaller hanging down so gracefully from the thicker ones, which are horizontal to the main stem; its pendulous, thin, small, pointed and persistent cones. The Morinda attains great dimensions.

In Kooloo, a little below the Jelsuri pass, we measured one which girted, four feet from the ground, nineteen feet; and towered some hundred feet into the heavens. In the Kohistan of the Punjab this species is common, and is floated down both the Jhelum and Chenab, under the name of Rai, and used in building boats; but its wood is not prized as it is so liable to decomposition by the action of the weather. Its wood, too, is soft and open-grained, and said by the native boat-builders, when converted into boats, not to last more than four or five years.

In Nepal another species is met with, distinguished from all other Himalayan species by its very small cones, which are not more than an inch in length: Abies brunoniana or dumosa.

Genus PICEA.

6. *P. Webbiana.*—This species is known under various names throughout the Kohistan of the Punjab and Himalayas. In Kooloo and the Chumba range, it is styled Tos,* Gurwahl, &c., Chilrow. It is characterised by its large bluish-black cone varying in size from four to eight inches—of a conical form flattened at the upper end. Its leaves are of a dark-green colour above, and silver white beneath. It is distinguished from the next species by its much larger and thicker cones and larger leaves, which are, also, proportionally narrower.

The Chilrow is a noble tree, growing to a height of eighty and a hundred feet, its dark sombre leaves contrasting well with the surrounding vegetation. From all the other Pines it can at once be distinguished by its much stiffer and upright conical form. In the Kohistan of the Punjab, as on the Khumba range, and on the Peer Panjal it is found in great abundance, at elevations of from 7,000 to 10,000 feet above the level of the sea; and, as mentioned, is there known under the name of Tos. It is floated down both the Jhelum and Chenab, and used in boat-building, &c., but is not a wood of any value as it is so easily decomposed by the weather: boats built of it do not last more than four or five years. In the Simla jurisdiction this tree is found forming extensive forests at Hattoo, Narkunda, &c.; also with the Row, and of great dimensions; hundreds of trees of eighty and a hundred feet in height, and as straight as an arrow, there existing. By its dark-green colour, erect and stiff growth, and horizontal branches it can at once be distinguished from the Row (Abies Smithiana), and from the Deodar by its conical head and darker colour. In addition to the forests of the Kohistan and Simla district, it grows abundantly in Gurwahl and Kumaon, and four miles to the east of Mussoorie. On the great mountain of Dodicatowli, near Lobah, it occurs in great perfection. When this species occurs associated with the Deodar, it generally occupies a more elevated position. Thus, on the Jelowri Pass, in Kooloo, ascending from the Mundi side, we find deodars and Morindas (Abies Smithiana) associated with the Mokroo Oak (Quercus dilatata), and Horse Chesnuts (Pavia indica). As we continue to ascend we find the Chilrow, some of them nineteen feet in girth, at three feet from the ground, and associated with manificent Khursoo Oaks (Quercus semecarpifolia). Still ascending, we leave the Chilrow, and find the Oaks associated with the Rhododendron campanulatum, which when we crossed the pass in April, was in full blossom and presenting a most striking and beautiful appearance, with its purple, pink, and white blossoms (as it presented all these colours, in some plants only one colour, in others two blended, and in others all the shades mixing and blending with each other in great luxuriance.) The foreground was covered with Primulæ, Ranunculi, Anemone, Verbena, Wallichiana, and Potentillæ. Associated with the Rhododendron were the dwarfish Khursoo Oaks, a small Berberis, and the Cratægus rupestris. The pass itself consists of clay-slate, and from its summit presents one of the most magnificent scenes any where to be met with in the wild, rugged, and bold country of Kooloo. On this lofty pass the Rajah formerly possessed a series of forts which were destroyed by the Seikhs, and amongst the ruins of one of these we found tailless rats (Arctomys Roylei) running about. As we descend the pass, on the Sutlej side, we first pass through Khursoo Oaks, then Pindrew, and Morinda, or Row, to the village of Khote, which is surrounded with Deodars. A little below the Deodar we meet with forests of Kuel (Pinus excelsa) and Mokroo Oaks, and still lower, forests of the Pinus longifolia, or Cheer, which we have before reaching Shumshale.

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* In Hazara it is named Pelunda.

7. *P. Pindrow* Royle.—By Dr. Royle the P. Pindrow is considered a distinct species from the P. Webbiana; and is characterised by its much smaller and thinner cones, which, too, are of a deeper purple colour, and seldom exceed three and a half or four inches in length, and its shorter, broader, stiffer, and furcate leaves. But other characters there are none, and possibly it may be a mere variety. If however, the cone is uniform in size and colour, it would form a very characteristic mark. I have in my possession a drawing taken from Dr. Royle's original specimen brought by him from Tyno Teba and deposited in the Mussoorie Garden. It is now

twenty feet high, and the cones never exceed four inches in length. In P. Webbiana they are seldom met with under seven inches. The furcation of the leaf, noticed as a distinguishing character, is not characteristic, seeing that it is common to both. In its distribution the Pindrow is much more restricted, and is in general found on more elevated positions, as on the Chor and Tyne Teba, &c.

Uses.—Its wood is adapted for building purposes, but is of no particular value.

Gen. CUPRESSUS.—The most important species belonging to this genus met with in the Himalayas, is the Cupressus torulosa, or Surroo snd Surin of the natives. In the Kohistan of the Punjab it does not, as far as we are aware, occur, but is common in Kumaon and Gurwahl. Near Simla in the neighbourhood of temples, it is met with and is styled DEODAR. The Deodar, therefore, known to the natives of Simla is the Cupressus torulosa and not the Cedar, it being styled by them, as already noticed, Keloo. At Nynee Tal, trees of Surroo, of vast dimensions, occur, the largest girting upwards of twenty-four feet, and rising to the height of eighty feet. In Gurwahl, too, it is abundant, as near Kunnoor, and at Surin or Surroo Tota, the place taking its name from the tree. There it occurs in the very bed of the river Dowli, the largest and longest branch of the Ganges, which takes its rise from a snow bed at the summit of the Neetee Pass, and there it is so small that we stepped across it in June.

Uses.—As a building material the Surroo is admirably adapted, its wood being very hard, close-grained, tough, long-fibred, and of a dark-red colour. The gates of Constantinople made by Constantine, and said to have lasted 1100 years, were manufactured of wood belonging to a species of Cypress (C. sempervirens, *Lindley*. The Himalayan Cypress seems to possess qualities almost equally good, and probably may even be equally durable ; but nowhere in the Himalayas are the forests of this wood in accessible places for removal to the plains.

Associated with the Cypress, between Malari and Bumpa, a species of Juniper, being a lofty fine tree, occurs, the Juniperus excelsa, and on the very verge of the snow, six miles beyond Neetee, a creeping species (Juniperus prostrata) is found, probably the so-called European Juniper of Moorcroft. By some authors it is mentioned, and Webb quoted as an authority as occurring in the Neetee Pass. This is a mistake, as nowhere is it met with beyond Gildoung, the last halting-place on the British side of the Himalayas, and some miles distant from Neetee Pass. Like the Surroo, the Juniper has only been, as yet, met with in inaccessible places.

Gen. TAXUS.—Throughout the Himalayas and Kohistan of the Punjab the Yew* (Taxus baccata), styled by the natives *Tooner*, is met with at elevations between 8,000 and 11,000 feet, as at Narkunda, near Kotghur, on the Chumba range, Dodicatowli in Gurwahl, &c.; but of all places in the Himalayas where it is met with in greatest perfection is at Toonghnath, between Budrinath and Kedurnath, at an elevation of 9,000 feet. Tere it occurs associated with Khursoo Oaks, Rhododendrons, Horse Chesnuts, Chilrow, Khutrows, &c.; forming one of the finest wooded scenes met with in the Himalayas.

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* Dr. Royle mentions two species of Yew, Taxus baccata, and Taxus nucifera. We have only met with one, the former.

Concluding remarks.—In the foregoing observations we have briefly noticed all the species of coniferous trees met with in the British Himalayas; pointed out that the Deodar (Cedrus Deodara) is the most valuable both for ship-building and architectural purposes; that the Cheer (Pinus longifolia) ranks next to it in quality, and that all the other species of Conifers are but little worthy of attention, so far as the qualities of their timber are concerned. We have stated that the only timber fitted for spars for ships is the Deodar,* all others being either too soft or too easily acted on by the weather; that timbers of the Deodar of the dimensions (eighty to ninety feet in length) wanted by the ship-builders in Bombay, as stated by the Superintendent of Marine, could not be transported from the British Himalayas with advantage, owing to the rugged and inaccessible nature of the country, and the difficulties caused by falls and rapids existing in the Sutlej, and that on the banks of the Beyas, but few Deodar timbers, comparatively speaking, exist worth exporting; that the Cheer timber is well adapted for architectural purposes, and might profitably be transported to Scinde, and that the Morinda (Abies Smithiana), the Kuel (Pinus excelsa), and the Chilrow (Picea Webbiana), though abundant, are, owing to the softness of their wood, and liability to decomposition by the action of the weather, not worthy of attention.

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* Dr. Gibson states that the Pinus excelsa appears to be the only timber worth transporting to any distance. This, however, is an error, as when exposed to the weather, Kuel timber rapidly decomposes. Possibly in mentioning the Kuel, he means the Keloo or Deodar (Cedrus Deodar). See Letter No. 583, dated Aug. 9, 1848, addressed to the Sec. to Gov. Bombay.

Monthly Proceedings of the Society.

(Saturday, the 1st October, 1853.*)*

W. G. Rose, Esq., Vice-President, in the chair.

The proceedings of the last month were read and confirmed.

The following gentlemen were elected members :

Ordinary Members.—Messrs. A. H. Cocks, C. S., T. P. Larkins, C. S. R. Morrell, William Grant, and Baboo Gyanendro Mohun Tagore.

Corresponding Member.—Dr. R. Riddell, Superintending Surgeon, Nizam's Service.

The names of the following gentlemen were submitted as desirous of joining the Society :—

Maximilian Böse, Esq., of Akyab,—proposed by Mr. A. T. T. Peterson, seconded by Mr. W. G. Rose.

Lieutenant Alexander Taylor, Bengal Engineers, Punjab,—proposed by the Rev. Dr. Carshore, seconded by the Secretary.

Lieutenant D. G. Robinson, Bengal Engineers, Punjab,—proposed by Dr. Carshore, seconded by the Secretary.

Captain Frederick Tombs, (18th N. I.) Pension Pay Master, Dinapore, —proposed by Dr. Falconer, seconded by Mr. Grote.

George Ackland, Esq., Merchant, Calcutta,—proposed by the Secretary, seconded by Mr. Rose.

G. D. Turnbull, Esq., C. S., Bolundshuhur,—proposed by Captain G. L. Cooper, seconded by the Secretary.

Presentations.

The following donations were announced :—

1. The Pictorial Sketch Book of Pennsylvania, *Presented by Mr. David Landreth.*

2. The "Sateya-Arnab," No. 1, of Vol. 4. *Presented by the Rev. J. Long.*

3. The Journal of the Indian Archipelago for February and March, 1853. *Presented by the Editor.*

4. Six quarts of Sandoway Tobacco Seed. *Presented by Captain F. W. Ripley, P. A. Comr. Arracan.*

5. A small quantity of Seychelles Cotton Seed. *Presented by the Hon'ble C. J. Bayley, Colonial Secretary, Mauritius.*

A quantity of Maize seed, of a superior description, the produce of the Society's Garden, was placed on the table; namely, 160 ears, raised from

American seed of the fourth descent, being imported by the Society in 1849; and 49 ears, raised from seed imported last year, both of one sort, known as the "Pennsylvania yellow corn." The latter is fully equal to the parent stock.

The Gardener's Monthly Report was read. The Gardener states that the under-drainage system, adopted in that part of the orchard which is retained for peach cultivation, has been fairly tested by the late heavy falls of rain; and has been found to answer so admirably that he takes the liberty of suggesting that certain other portions of the orchard be similarly treated, in order to improve the culture of the fruit trees, especially lychees, which are grown thereon. The mango trees are now making their third healthy growth; 900 fine healthy mango grafts of 15 kinds are now ready for distribution, together with other sorts of fruit trees, lychees excepted. Mr. McMurray observes that the maize seed, (alluded to above) forms *part* of a good *third* crop taken off one plot of ground in little more than *ten* months; the two previous crops being peas and tobacco. The following is the mode adopted by the Gardener for raising the present crop of maize: "The ground for sowing the maize seed on was thoroughly cleaned of all weeds in June last, by ploughing and harrowing three times. After each harrowing the weeds were picked off. On the 6th July, lines were marked off 5 feet apart, and the seed dibbled in, one inch deep in the ground, with a blunt ended dibble, at a distance of 3 feet up and down the rows; three seeds being put down in a triangular form within four inches of each other. The ground was then levelled, after which the crop was three times cleaned by hand weeding, and twice moulded during the season to steady the plants, and encourage a more vigorous growth." The Gardener reports that one more of the *Victoria regia* seeds, presented by Dr. Wallich, in November, 1851, has germinated; that the largest plant is progressing favorably having yielded its tenth flower, and possessing 53 leaves. The Vanilla pods are doing well, and the plants are making such a healthy and vigorous growth that a good crop of flower spikes may be anticipated in March next.

Read a letter from the Secretary to the Council, applying for sick leave of absence to England for a period of one year, and enclosing a certificate from Dr. Jackson, recommending his absence from India for that period. Mr. Blechynden states that having no other reliable source of income, he hopes that, in consideration of approved service of 17 years, the Society will grant him the above leave and place him in a position to carry it into effect.

Submitted the following recommendation from the Council on the above letter:

"The Council recommend to the Society that the Secretary's application for leave of absence be complied with, and that in order to enable him to carry it into effect, the Society, in consideration of Mr. Blechynden's zealous and approved service, during a period of 17 years, grant him his full salary for a period of one year, being Rs. 4,800."

In connection with the above Dr. Falconer, gave the following notice of motion for the next meeting:

"That the Secretary's application for leave of absence be complied with, and that in order to enable him to carry it into effect, the Society, in consideration of Mr. Blechynden's zealous and approved service during a period of 17 years, grant him, as a special case, his full salary for a period of one year."

It was further proposed and agreed that the Council be requested to report on the best manner of conducting the business of the Society, during Mr. Blechynden's contemplated absence.

Proposal for the introduction of the Quinine yielding Cinchonas into India.

Read the following letter from the Government of Bengal on the above important subject:—

FROM THE UNDER-SECRETARY TO THE GOVERNMENT OF BENGAL.

TO THE SECRETARY TO THE AGRI-HORTICULTURAL SOCIETY.

Dated Fort William, the 8th September, 1853.

SIR,—In continuation of the letter from this Office No. 531, dated the 1st April, 1852, I am directed by the Most Noble the Governor of Bengal to forward herewith for the information of the Society, an extract (paragraph 39) of a despatch from the Hon'ble the Court of Directors No. 44, dated the 6th July last, relative to the obtaining of a supply of the seed and plants of the Quinine yielding Cinchonas.

General.

I have, &c.,
W. GORDON YOUNG.
Under-Secy. to the Govt. of Bengal.

Extracts from a despatch from the Hon'ble the Court of Directors in the Public Department No. 44, of 1853, dated the 6th July.

39. Seeds of the best species of Cinchona have already been sent to Dr. Falconer, and six plants were forwarded under charge of Mr. Fortune, by the Mail of 20th December, 1852. Effective measures will be adopted for procuring a supply of the seeds and plants from South America to a greater extent.

Letter dated March 27. (No. 18) 1852 Proposal to depute a gardening collector to South America to procure seed and plants of the Quinine yielding Cinchonas.

(True Copy.) W. GORDON YOUNG,
Under-Secy. to the Govt. of Bengal.

Communications on various subjects.

Read the following letters :—

1. From Capt. G. E. Hollings, Deputy-Commissioner, Shahpore, Punjab, communicating further particulars respecting Mŭddār Gutta Percha : Capt. H. adds, "I have some 25 or 30 lbs. prepared, which I shall be glad to place at the disposal of the Society if they feel inclined to recommend the institution of any experiments."

Resolved.—On the recommendation of the Council, that the obliging offer of Capt. Hollings be communicated to Professor O'Shaughnessy on that gentleman's return to India.

2. From Dr. Wallich advising despatch per overland conveyance, of a consignment of French flower seeds from Messrs. Vilmorin, Andrieux and Co., of Paris, and of German flower seeds from Mr. Van Houtte of Ghent, in accordance with a requisition from the Society for European continental seeds of ornamental plants and shrubs. "I will not conceal in any manner," observes Dr. Wallich, "that I have my strong fears that the present experimental consignment of continental invoices of seeds will lead to no satisfactory results. That the selections are intrinsically of great value there can be no doubt. I have the best authority for so saying,—Dr. Lindley's, whom I consulted with on the subject a few days ago, but they are very expensive, and in Mr. Van Houtte's case remarkably so, though on the other hand it is but fair to add that among his seeds are a good many very rare and precious ones. I have done all I could under the circumstances in which I was placed, the utter want of any list to guide me as to what the Society already possesses and is most in want of, left me no alternative but to grope my way in the dark."

Resolved.—That the best thanks of the Society be tendered to Dr. Wallich, for the trouble he has so kindly taken in the matter of these invoices of seeds, and as they are not sufficiently large to admit of a general distribution, the recommendation of the Council, that they be offered to members at cost price, be adopted.

3. From Lieutenant-Colonel W. H. Sleeman, intimating, in reference to the Society's request for grafts, that no good peach trees are cultivated at Lucknow. "During my residence of more than forty years in India,"—remarks Colonel Sleeman,—"I have never seen so bad a place for peaches as Lucknow. I have many trees in my own garden here, but not one that produces a fruit that would be tolerated at any other station I have seen in India ; and those produced in the public garden are not a bit better. I would recommend your applying to some other places in Behar, Patna, Dinapore, Mozufferpore, Chupra. These are the places where I have seen the finest peaches and grapes.

The grapes here are as bad as the peaches. Of 110 lychee grafts which I got from the Society some time ago, only two remain, and they have been preserved with difficulty. The climate is too dry for them, and this may be the obstacle to our having good peaches and grapes. The soil, too, seems to abound too much in alkaline matter. But whatever may be the obstacle I recommend your supplying yourself from some other source with peach trees. Mangoes and melons are the only fruits we get good at Lucknow."

Resolved.—That the above letter be referred to the Council, and that steps be taken by them to procure good peach grafts from other localities.

4. From the Rev. J. Phillips, applying for seeds of sorts for the use of the new Native Christian settlement at Santipore, near Jellasore.

Agreed that *agricultural* seeds of all sorts be given *gratis*, and *horticultural* seeds at *cost price.*

5. From R. R. Sturt, Esq., Honorary Secretary Agricultural and Horticultural Society, Bhagulpore, enclosing a list of plants growing in their public garden, and requesting a collection of ornamental plants, &c., of sorts, which they do not possess.

Agreed that this request be complied with.

Letters were also submitted from Baboo Prosononauth Roy, of Nattore; Kalee Chunder Roy, of Rungpore: and Rajah Narendra Krishna Bahadoor, giving distribution lists of Part II of Vol. 1 of the Indian Agricultural Miscellany in Bengali.

Submitted applications from the Head Gardener, for a new cart, in place of the old one, which has become unserviceable, and for the services of 6 extra coolies for 6 months.

Resolved, on the recommendation of the Council, that the sum of Co.'s Rs. 90 be allowed for a new cart; and that the 6 extra coolies be also granted for 6 months, the amount for which will not exceed the aggregate sum deducted from the wages of absentees in the establishment bills for the last 6 months.

(*Saturday, the* 12*th November*, 1853.)

W. G. Rose, Esq., Vice-President, in the chair.

The proceedings of the last General Meeting were read and confirmed.

The following gentlemen were elected members: Lieutenant Alexander Taylor, Bengal Engineers; Lieutenant D. G. Robinson, Bengal Engineers; Captain Frederick Tombs; Messrs. Maximilian Böse; George Ackland; and G. D. Turnbull, C. S.

The names of the following gentlemen were submitted as desirous of joining the Society:—

Captain J. Hall, 2nd in command, Joudpore Legion,—proposed by the Secretary, seconded by Captain J. C Brooke.

Lieutenant William Agnew, (29th Regt. N. I.,) P. A. Commissioner Assam,—proposed by Lieutenant-Colonel F. Jenkins, seconded by the Secretary.

A. J. Jackson, Esq., C. S., Khoolna, Jessore,—proposed by Mr. McLeod Wylie, seconded by Mr. H. Alexander.

J. Cearns, Esq., of Munglepore,—proposed by Mr. William Cockburn, seconded by the Secretary.

C. M. Wilsone, Esq., of Munglepore,—proposed by Mr. William Cockburn, seconded by the Secretary.

Presentations.

The following donations were announced :—

1. Seeds of the "Cabbage oil," and blue dye plants of the Chinese, and seeds of four varieties of melons. *Presented by Mr. R. Fortune.*

The following is extract of Mr. Fortune's letter respecting the above seeds :—

"The Cabbage oil plant forms one of the staple productions in the Provinces of Chekiang and Keang-soo during the winter and spring months, and is highly valued by the Chinese. I believe the Chinese kind is considered more productive than any of our European varieties, and it is possible it may be better than those at present cultivated in India. At all events, I send it round for trial, and venture to suggest its being sent to a district where oil of this kind is produced. The "Tein Ching." *(Isatis indigotica)* is the plant which produces the Shanghae liquid Indigo, a substance largely used in this part of China, where blue cotton cloth is in great demand amongst the masses of the people. The four varieties of melon are also sent for experiment. They are valuable in China, not so much on account of their flavour as their productiveness, and they grow luxuriantly without that care which it is necessary to bestow upon English melons introduced to this country. In the summer months the markets are abundantly supplied with these fruits, which are in fact the apples of the country, and are eaten by the natives much in the same way as we see apples in country towns at home."

Portions of the above seeds are available to members desirous of giving them a trial.

2. Samples of grain of various sorts, procurable by purchase at Prome. *Presented by Major James Ramsay, Commissary General.*

These are submitted for inspection, as the produce of a foreign market. Major Ramsay states that he is unable to furnish a correct statement of the prices at which the above articles are to be obtained, and which did not accompany the samples in consequence of the market being at the time in a fluctuating state. (Referred to the Grain Committee.)

3. Thirty varieties of Australian seeds. *Presented by W. H. Duval, Esq.*

4. A few cuttings of the Muscatel vine. *Presented by Mr. J. Thomson.*

The following is Mr. Thomson's account regarding his vine :—

"My tree has fruited twice this year, and is again in flower, and some of the fruit already (3rd Nov.) set. The particulars regarding this vine are as follows :—when I took possession of the house in September, 1851, the said tree was densely crowded with branches and leaves, and on enquiry I found it had never borne fruit before, and was apparently an old tree ;—so I was obliged to have recourse to the plan adopted in France and Portugal, namely, of cutting the tree down to about 4 feet from the ground, peel ing the old bark, opening out the roots, washing them and leaving them open for one month ; after that, I had the roots nicely covered with manure composed of fish, old shoe leather, rags and paper, the whole mixed up with common earth. In January, 1852, the new shoots produced blossoms, and the fruit ripened in the May following. In October, 1852, I pruned the superfluous branches, stripped the loose bark, opened out the roots, washed and exposed the same for two months and better. In January, 1853, covered the roots with the aforesaid manure. On the 13th March, 1853, it flowered, and the fruit ripened on the 14th June ; it was of the most luscious flavor and in great abundance, and would have been much larger had I thinned the bunches a little more. In July 1853, it blossomed again, and the fruit ripened on the 24th September equally as good, but not so abundant as on the former occasion. The same day I lopped the whole of the branches that bore, and likewise the small flat ones that did not bear, and on the 10th October, 1853, I opened out the roots and exposed them till the 16th idem when, to my great astonishment, I saw the Grape vine again in blossom. Hitherto, in appearance, it promises to yield me a large supply of fruit, when I shall have the honor to forward a specimen for the purpose of being laid before the Society."

5. Four plants of *Colvillea racemosa* from the Rajah of Burdwan's Garden, at Garden Reach. *Presented by Baboo Ramapersaud Roy.*

6. Four Durian plants from Singapore, two orange plants, and three plantain plants from Rangoon. *Presented by Capt. J. Weston.*

7. A specimen of coffee grown in the Mysore country. *Presented by T. M. Robinson, Esq.*

"I am informed," observes Mr. Robinson, "that the cultivation of the article in that country has only commenced within the last fifteen or sixteen years, but it has already become one of a very extensive trade, land being abundant there, and the price of labour being only three-half pence per day, the cost of production is, I believe, very small." (Referred to the Coffee Committee.)

8. A small quantity of the nuts of *Aleurites triloba,* a fine oil—yielding seed. *Presented by Dr. R. Riddell.*

Dr. Riddell gives some interesting particulars in continuation of his former communication, which appeared in the August proceedings, regarding this oil, and furnishes copy of a communication from Dr. Alex. Hunter, of Madras, Secretary of the Indian Drug Committee, on the same subject. (Referred to the Committee of Papers.)

9. Additional specimens of "Mŭddār Gutta Percha." *Presented by Capt. G. E. Hollings, Deputy Commissioner Shahpore, Punjab.*

A few pods of *Vanilla aromatica* and *V. grandiflora*, the produce of the Society's Garden, were also placed on the table.

The motion, of which notice was given at the last General Meeting, by Dr. Falconer, "that the Secretary's application for leave of absence be complied with, and that in order to enable him to carry it into effect, the Society, in consideration of Mr Blechynden's zealous and approved service during a period of 17 years, grant him, as a special case, his full salary, for a period of one year," was brought forward, seconded by Mr. Cantor, and carried *nem con.*

The Gardener's Monthly statement was read. Mr. McMurray reports that the batch of American vegetable seeds has turned out equally as good as those of previous years. That seventeen more kinds of the English flower seeds (Carters) have germinated, leaving only nine sorts out of seventy-one, which have not germinated, viz., *Blumenbachia insignis*, *Ipomopsis* mixed, *Loasa* and *Scypanthus* mixed, *Poinciana Gillesii*, *Phlox Drummondii*, *Podolepsis* mixed, *Sollya*, *Violet*, and *Calceolarea*. Such of the German and French flower seeds, the Gardener adds, as have been first sown, have germinated freely, but on this point he will give a fuller report next month. Mr. McMurray mentions that the plants raised from the Demerara indigo seed, presented by Mr. Piddington in September, 1852, are now yielding a heavy crop of seed, which will be available to members shortly. The American *Sumach* trees are also flowering freely, and will probably yield another large crop of seed in March next. The Gardener further reports as follows: "The plantation of Straits cocoanut-trees, raised from the seed presented by Mr. Joseph Agabeg in 1849-50, has made a very healthy growth during the past season, and now form a fine belt on the N. W. side of the garden. The same remark is applicable to the betel-nut trees, also presented by Mr. Agabeg. In the batch of flowering plants, presented to the Society in December, 1852, by Sir L. Peel, there were six seedling *Tecoma jasminoides*, one *Indigofera* species, and one *Abutilon Bedfordianum*, which Sir Lawrence wished to be carefully looked after. This, I am happy to say, has been done, not only in the case of these, but the whole of the plants received at that time have succeeded well, and have been more or less increased in number, more especially the white *Poinsettia*. The cuttings of *Rosa Fortunii*, received at the same time, have also been successfully propagated, and the plants are now doing well. The Persian lilac (*Syringa laciniata*) seedlings, raised from the seed presented to the Society, by

Captain Burnett, in April last are doing well, and now amount to twenty-three plants in all of different sizes: as also many of the plants raised from the Punjab seed presented by Captain Blagrave. The drooping or weeping Sissoo, presented by the Agricultural and Horticultural Society of the Punjab in April last, germinated freely, and many strong seedlings are now ready for distribution to the members. I may also here state that, in addition to the number of peach grafts required for immediate issue, there are three hundred (300) very healthy strong plants in store ready for distributing, at the fixed scale of prices. The large plant of *Victoria regia* has grown itself off the mound, where it was planted in the tank at the end of the rosery, and has since made two new leaves in the gumlah, where it is now planted. The largest leaf now in the garden, of another plant, measured this morning (12th November,) four feet one inch in diameter; and one more of the batch of seeds presented by Dr. Wallich, in November, 1851, germinated on the 7th October last."

Defaulters to the Society.

The Council having submitted the names of three late members who had failed to pay up the arrears of subscriptions due at the period of their resignation, it was resolved that, in accordance with the provisions of Section 1 of Chap. IV. of the Bye-Laws, they be published as defaulters. Their names are as follows:—Mr. S. G. Smith, late of the Civil Service; Mr. F. Tucker, Civil Service; and Mr. T. J. Atkinson, of Burdwan.

Communications on various subjects.

The following communications were also submitted:—

1. From W. G. Young, Esq., Under-Secretary Government of Bengal, furnishing extract of a letter from Mr. R. Fortune, dated 18th July, seeking more precise information regarding the Chinese green vegetable dye, to which the attention of the Society was called by Mr. Henley in March last.

2. From R. Fortune, Esq., dated Chusan, 18th July, on the subject of obtaining seeds, plants, &c., for the Society.

With reference to the above two communications, it was agreed, on the recommendation of the Council, that a copy of M. Persoz's Memoir, published in "Les Comptes Rendus," of the 18th October, 1852, on the green vegetable dye of the Chinese, be forwarded to the Government of Bengal for Mr. Fortune's information. Further, that the sum of £50 be placed at Mr. Fortune's disposal to enable him to meet all expenses, except freight, connected with the Society's requisitions for plants, seeds, &c., and that the P. and O. Company be solicited, as a special case, to forward such boxes of plants as Mr. Fortune may send from Shanghae, free of freight to the Society.

3. From Captain G. E. Hollings, dated Shahpore, Punjab, 25th September, forwarding the specimen of Mŭddār extract, alluded to among the donations received, and giving some particulars respecting it.

4. From Dr. W. B. O'Shaughnessy, Superintendent Electric Telegraph, dated 8th November, intimating his readiness, as requested by the Society, to subject the Mŭddār extract prepared by Captain Hollings to conclusive experiment as to its applicability as a substitute for Gutta Percha for telegraphic purposes.

Resolved.—That a copy of the above letter be forwarded to Captain Hollings.

5. From Dr. R. Riddell, dated Bolaram, 4th October, regarding the Mŭddār extract.

6. From W. Haworth, Esq., respecting the arrowing of sugar-cane, accompanied by a fine specimen. The following is extract of Mr. Haworth's note on the subject:—"The flower of the sugar-cane now submitted was cut by me from a field near Kandy, the cane in which was *all* in flower, as well as in several other fields around the sugar works. It was of the Mauritius variety, and appeared to be nearly ready for cutting. I was informed that it is quite usual for the sugar-cane to flower on the estates in Ceylon. I am aware that it flowers (or "arrows" as it is generally termed) in some of the West India Islands, and I enclose you a note from Mr. John Thomson, of Cossipoor, on that point, who has also met with it in flower in Bengal. On returning from Kandy, I noticed the purple sugar-cane growing alongside some of the Mauritius kind planted in very small patches near native huts, and whilst I often saw the latter in flower, I could not find one of the former in the same condition.

There appears to be seed on the flower left with you, but whether it would germinate I think very doubtful, it is however worth the trial."

Extract of a letter from John Thomson, Esq., dated Cossipore, 6th November, 1853:—"With regard to the flowering of the sugar-cane I am no botanist, and cannot say whether or not flowering is the proper term to apply to the phenomenon, but there is no doubt whatever that the sugar-cane sends up a long tapering feathery looking head. I have seen thousands of acres of it in the West Indies, and it is there called *the arrow* of the cane. I have also seen it in Bengal but not very often. I do not think, however, that what you believe to be the seed of the sugar-cane would germinate if it were put in the ground. At least I am not aware of sugar-cane ever having been produced from seed. In the West Indies, where they have not the same variation of season as in Bengal, the sugar-cane is allowed to stand much longer on the ground sometimes from 13 to 16 months. If I remember rightly the season of arrowing is about November or December in the West Indies, or perhaps earlier, a good deal depending upon what time the canes have been planted. I believe that it is from the short time which the cane is allowed to stand on the ground that we never see the arrow in Bengal; but I have very little doubt that if sugar-cane were allowed to stand through one cold season and on to the next, we should see plenty of cane arrow here."

In connection with the above subject the Secretary read a passage from Porter's Work on the sugar-cane, pp. 24 and 25; and drew attention to certain communications submitted to the Society, in 1844, (Journal, vol. 3, pp. 84-86,) arising from an application by the Royal Agricultural Society of Jamaica for seed, under the impression that the cane is propagated by seed in the East Indies, as well as by cuttings. Among other particulars published on that occasion it is stated by Colonel Jenkins, that the Otahoite cane flowers freely at Gowhatti in Assam:—"Some hundreds of canes in Dr. Scott's plantation may be seen in flower at once, but I think only in plants three or four years old, *i. e.*, canes which have been planted three or four years, and allowed to remain undisturbed as far as regards the roots or stools." The Secretary added that he had transferred a portion of the Ceylon seed to Mr. McMurray, for careful trial, as suggested by Mr. Haworth, in the Society's Nursery Garden, where the rattoon crops of foreign varieties of cane, more especially the China sort, had frequently been found to arrow.

7. From F. A. Glover, Esq., C. S., offering,—with reference to the Society's wish for good peach grafts, to increase the sorts in its garden,—to send a quantity from the trees in his garden at Mooteeharree, Champarun, the fruit of which is equal to any he has ever tasted in India.

Resolved.—That Mr. Glover's kind offer be accepted, and that, as recommended by the Council, an application be also preferred to Dr. Jameson, Superintendent H. C. Botanic Gardens N. W. P., for grafts from the Saharunpore Garden.

8. From Dr. Wallich, dated London, 19th August, enclosing copy of correspondence with Messrs. Vilmorin, Andrieux and Co., of Paris, and Mr. Van Houtte, of Ghent, respecting the flower seeds lately supplied by them.

9. From H. Cope, Esq., Secretary Agricultural and Horticultural Society of the Punjab, applying for a few seeds of *Victoria regia*. Request complied with.

10. From S. Douglas, Esq., applying on behalf of the Rev. Mr. Schurr, of Kishnaghur, for seeds of sorts, for the use of the Christian settlement at Kapasdanga. Agreed, that Agricultural seeds be supplied *gratis*, and Horticultural seeds at *cost price*.

11. From the Rev. J. Phillipps, offering his acknowledgments for the seeds lately supplied for the Christian settlement at Jellasore.

12. From Baboo Kissory Chand Mittra, Deputy-Magistrate, Jehanabad, acknowledging receipt of ten copies of the Indian Agricultural Miscellany,

(part 2, of vol. I) and giving a list of persons to whom they have been distributed.

(Saturday, the 10*th December,* 1853.*)*

W. G. Rose, Esq., Vice-President, in the chair.

The gentlemen who were proposed at the last Meeting were elected Members, viz:—

Captain J. Hall; Lieut. Wm. Agnew; Messrs. A J. Jackson, C. S.; J. Cearns and C. M. Wilsone.

The names of the following gentlemen were submitted as desirous of joining the Society:—

Edward Greenway, Esq., of Cawnpore,—proposed by Mr. Wm. Vincent, seconded by the Secretary.

G. Berford, Esq., C. S., Mozuffurnuggur, near Meerut,—proposed by Mr. D. Mackinlay, seconded by Mr. W. McAdam Stewart.

Dr. J. Fayrer, Manager of the "Char Bagh," Lucknow,—proposed by the Secretary, seconded by Mr. C. A. Cantor.

Richard Blechynden, Esq., Merchant, Calcutta,—proposed by Mr. W. G. Rose, seconded by the Secretary.

George Allardice, Esq., Calcutta,—proposed by Baboo Peary Chand Mittra, seconded by Baboo Gobin Chunder Sen.

Baboo Sham Chaund Mitter, Merchant,—proposed by Mr. C. A. Cantor, seconded by the Secretary.

Presentations.

The following donations were announced:—

1. Journal of the Royal Asiatic Society of Great Britain and Ireland, Vol. XV. Part. 1. *Presented by the Society.*

2. Journal of the Asiatic Society of Bengal, No. 5 of 1853. *Presented by the Society.*

3. Report of the Bombay Chamber of Commerce, for 1852-53. *Presented by the Chamber.*

4. A box of Rice, the produce of Bhawurkote. *Presented by Sir James Colvile, on behalf of Major G. Ramsay, the Resident at Nepal.*

The following is extract of Major Ramsay's letter:—"Mr. Courtenay informs me that you will be glad to receive for presentation to the Agri-Horticultural Society of Calcutta, some old rice which was lately found by one of General Jung Buhadoor's brothers at Bhatgaon, a town about 10 miles East of Khatmandoo, the capital of a former dynasty of the Newars, aborigines of the valley. I have therefore forwarded a packet of it to your address by to-day's dâk banghy.

"A very large box of this grain was discovered on breaking up the flooring of one of the Newar Palaces; and by an inscription on the box, it appears that it was brought from Bhawurkote in Nepâl, a place then famed for its rice, when that town was conquered by the Rajah of Bhatgaon in the year 1743."

The Secretary stated that a small portion of the above paddy had been transferred to the Society's garden: it was agreed to distribute the remainder to such of the Members as may be desirous of giving it a trial.

5. Samples of sugar-cane, of arrowroot tubers and powder, of the Red Yam of Chota Nagpore, Jerusalem Artichoke, and Tenasserim Yam, the produce of the Baraset School farm. *Presented by Baboo Peary Churn Sircar, Secretary Local Committee Public Instruction.*

6. A small quantity of Sea Island Cotton Seed from the plantation of Mr. W. Seabrooke, Eddesto Island, Charlestown, South Carolina. *Presented by Mr. J. L. Nash.*

Mr. Nash states that the above plantation yields the finest description of cotton; a muster of it was submitted at the Great Exhibition, and gained a medal: it was declared by Manchester spinners to be the best ever imported into England.

Read a report from the Council, intimating that in their opinion, the project of establishing a garden on the Calcutta side of the river, proposed about two years ago, is not feasible on the plan then contemplated, in consequence of the comparatively small amount contributed by the public, and the difficulty of finding a suitable site.

Proposed by Dr. Falconer, seconded by Mr. Cantor and resolved.—"That, in the opinion of this Meeting, it is not feasible at the present time, to carry out the original scheme of the proposed new garden; and that the money be returned to the subscribers."

Read a report from the Garden Committee, respecting the Nursery garden. The Committee suggest certain improvements in the shape of an additional conservatory, pucka ghauts, &c.; they state that the various useful cultures, such as sugar-canes, tapioca, arrowroot, guinea grass, sumach, &c., have been well attended to; recommend that a portion of the garden on the western side be appropriated as an experimental coffee plantation; and that the rates hitherto charged for fruit grafts be reduced one half, from the commencement of next year. Confirmed.

The Gardener's Monthly Report was read. Mr. McMurray submits a favorable tabular statement of the germination of the seeds of vegetables, cotton, tobacco and maize, received this season from the United States, shewing a general average per centage of sixty-four.

"In continuation of my report of Mr. Carter's English flower seeds, I have further to state that four more kinds have germinated, viz., *Sollya heterophylla*, *Calceolarea* of sorts, *Phlox Drummondii* and *Ipomopsis;* leaving at present five sorts out of the seventy-one not germinated; the two former kinds have come up very freely after lying dormant in the soil since the 20th August last, the date of their sowing. I may further add that many of the sorts of seeds of this batch which germinated during the rainy season, and then were damped off, are again coming up freely, from which circumstance I would suggest that the seeds generally complained of by the Members should have a further trial before the soil is thrown out of the gumlahs. Fifteen out of the thirty-five kinds of Cape of Good Hope tree and shrub seeds, received on the 26th October, and sown on the 6th November, have germinated. Twenty-seven kinds of the eighty-one sorts of flower seeds received from Germany have germinated, and sixty-eight of the 263 kinds of flower seeds from France. Of the thirty varieties of Australian tree and shrub seeds received from Mr. W. H. Duval on the 12th and sown on the 14th November, twelve kinds have already germinated. The cabbage oil and blue dye plants of the Chinese, and four kinds of melon seed presented by Mr. Fortune, have germinated very freely. I may further state for the information of Members and others that the five kinds of sugar canes (Mauritius, Otaheite, Singapore, striped Bourbon and China) are now ready for cutting, and may be distributed at any time at the fixed scale of prices."

Mr. McMurray adds, in conclusion, that another large plant of *Victoria regia*, opened its first flower on the 9th instant, and two more flowers are in different stages of development.

Submitted a report from Mr. James Cowell, (a Member of the Coffee and Tobacco Committee) on the muster of coffee received from Mr. T. M. Robinson, as the produce of the Mysore country, and laid before the last General Meeting. "I infer"—observes Mr. Cowell,—"from the size and shape of the bean that it is produced on the hills, or on lands of considerable elevation above the level of the sea, and it appears to have been gathered some months ago. This sample has not been well cured, and therefore is somewhat deficient of the fragrance of the Arabian berry which it resembles, in other respects, and being a good marketable article I value it, by last accounts from London, at 48 to 50 shillings per cwt. in bond."

Letters were read :—

From the Agent and Superintendent P. and O. Company, intimating his compliance with the Society's request for free freight for cases of plants from China, with certain restrictions.

Resolved.—That the best thanks of the Society be tendered to Captain Lovell for his liberal compliance with its request.

From Baboo Peary Churn Sircar, Secretary Local Committee of public instruction, Baraset, respecting the various products noted under the head of contributions :—

"The arrowroot has been manufactured here with the assistance of a mallee Dr. Falconer had the goodness to send to me for a week. The tubers were weighed when dug out of the earth, and the powder when perfectly dry has been found to be nearly six seers for every maund of the tubers. Cuttings of the sugar-canes were obtained from the Female School Committee's Agricultural Institution, and set about the end of December last. Those manured with oil cake and lime have thrived best. The cotton and vegetable seeds obtained from you in October last, have been sown in this farm and distributed to sixteen indigenous cultivators, and about eighty pupils living in Baraset and at distances from 2 to 6 miles. Tobacco and cabbage plants as well as 300 cuttings of flower trees of different sorts, mostly indigenous, have likewise been given to about the same number of persons. Tubers of the arrowroot and others will also be distributed, but as the quantities I have will hardly be sufficient for the purpose, I beg you will be pleased to order some of each sort to be delivered to me if available.

Much good has certainly resulted from the existence of the two Agricultural Schools here. Indigenous cultivators now evince a desire of growing in their farms foreign vegetable roots, &c., and of the pupils attending the Institutions, many of respectable families have got about their houses small kitchen and flower-gardens, wherein they not only superintend and direct labourers, but also work with their own hands. Agricultural pursuits, so long held degrading to gentlemen, are being properly appreciated, and will, it is presumed, ere long be carried out on improved plans and methods."

Resolved.—That a further supply of arrowroot tubers be given ; and that a sample of arrowroot powder, manufactured last season at the Society's Garden, be forwarded to Baboo Peary Churn Sircar, as a guide, the specimen sent by him being indifferently prepared ; and that his attention be directed to the article on the manufacture of arrowroot, published in the Indian Agricultural Miscellany in Bengali, Vol I., Part. 1.

From Captain G. E. Hollings, Shahpore, Punjab, dated 26th November, notifying his intention, with reference to his former communication, of sending a quantity of the Mŭddār Gutta Percha to Dr. O'Shaughnessy. Captain Hollings adds,—"The cotton grown here from American seed, acclimatised at Leia, is as fine as the produce of the original seed, notwithstanding the great heat and dryness during the hot weather and rains. The American vegetable seeds you sent me have proved as good as usual."

From the Secretary, tendering his best acknowledgments for the very handsome manner in which his request for sick leave of absence has been responded to; offering his services to the Society, while in England, in any way they may deem desirable; and pointing out, more especially, certain objects to which, he thinks, his attention may be advantageously directed.

Resolved.—That the Secretary's offer of his services be accepted with thanks.

Before the Meeting separated it was *Resolved* :—

1st. That the Garden Committee be requested to report to the next meeting respecting consignments of seeds for 1854.

2nd. That the Floricultural Committee, and Fruit and Kitchen Garden Committee, be authorized to make the necessary arrangements, respecting the approaching flower and vegetable shows.

Applications were submitted from Bhowany Churn Bose, and Joygopal Chatterjea, writers of the Society, for an increase of pay.

Resolved.—That they be allowed to draw Rs. 13 each from the commencement of next year.

Report from the Council to the Annual General Meeting, January 14th, 1854.

The Council, in accordance with established usage, submit a brief summary of the present position of the Society, and of its operations during the past year.

The subject which they consider first to claim attention, is the state of the subscription list. It is satisfactory to record an accession of sixty-nine names, since the submission of the last report. Of these 18 are Civilians, 5 Merchants, 22 Military Officers, 3 Medical Officers, 8 Native Members of the community, 10 Indigo planters, one Clergyman, one of the legal profession, and one (Dr. R. Riddell) who has been elected a Corresponding Member. The losses from death and resignation have been considerable. There have been 16 deaths and 38 resignations; to these must be added one* name struck off for non-payment of subscription, 3 insolvents, and 16 whose names have been removed from the list, in accordance with Section 6 of Chapter 3 of the Bye Laws, their absence from India having extended beyond four years, making in all seventy-four.

The distribution of the Members, as they now stand, may be referred to the following classes:—

CLASSIFICATION.	In 25 former years.	In 1846.	In 1847.	In 1848.	In 1849.	In 1850.	In 1851.	In 1852.	In 1853.	Gross Total.	Total real number at close of 1853 after deducting lapses.
Honorary Members,	11	1	0	1	0	0	0	1	0	14	10
Associate Members,	2	0	0	0	0	1	1	0	0	4	3
Corresponding Members,	0	1	0	0	0	0	1	1	1	4	4
Civilians,	232	13	15	22	8	10	22	16	18	356	151
Merchants and Traders,	201	14	12	13	10	14	20	12	5	301	99
Indigo and other Tropical Agriculturists, ...	190	15	6	5	1	9	19	13	10	268	89
Military Officers,	160	10	11	11	11	9	34	18	22	286	134
Medical Officers,	80	0	2	3	5	7	4	5	3	109	32
Asiatics,	63	2	14	5	6	9	8	8	8	123	52
Clergy,	14	1	0	0	0	2	1	1	1	20	6
Law Officers,	40	1	0	0	6	4	6	3	1	61	21
Miscellaneous,	9	0	2	0	2	2	6	0	0	21	17
	1002	58	62	60	49	67	122	78	69	1567	618

---

* The names of 3 Members have been actually published as defaulters in the proceedings of the last year; two of these are not however included in the above list, they having resigned previous to 1853; but have failed to pay up their arrears of subscriptions.

Of the above-mentioned number (618) 39 are members who have compounded for their subscriptions, 54 are absent from India, and consequently non-paying; 10 are Honorary, 4 Corresponding, and 3 Associate Members, in all 110, leaving 508 as the actual number of paying Members on the books of the Society on the 1st of January, 1854, or 7 less than last year.

The Members who have been lost to the Society by death are Capt. C. S. Reynolds, Assist.-Commissioner of Assam; Mr. W. N. Hedger, Solicitor; Mr. John Tynan, of the Salt Department; Baboo Woomeschunder Ghose; The Rev. W. O. Ruspini; Major W. M. Stewart, Sir W. R. Gilbert, and Major J. Ferris, all of the Bengal Army; Mr. D. Jardine, Merchant; the Hon'ble James Thomason, Lt. Governor N. W. P.; Mr. A. E. Brown, Indigo planter; Mr. John Hayton, Sugar Manufacturer; Mr. W. D. Brown, Merchant, Arracan; Mr. W. Greenway, Merchant; Capt. T. Latter, Deputy Commissioner of Prome; and the Rev. W. Carey (eldest son of the Rev. Dr. Carey, the Founder of the Society) an Associate Member.

The Council have again to report favorably on the condition of the finances of the Society, and to submit the usual statements of receipts and disbursements, vested fund, arrears of subscription, and liabilities. As regards the first, it will be observed that the receipts amount to Rs. 30,269-6-5, to which sum must be added the further amount of Rs. 1208-6-5, being balance at the close of 1852, making a total of Co.'s Rs. 31,477-12-10. The disbursements during the year have been Co.'s Rs. 29,130-7-8, leaving a cash balance in the Bank of Bengal, in the hands of the Government Agent, and with the Secretary, of Co.'s Rs. 2,347-5-2, on the 31st December, 1853.

The Council do not deem it necessary to draw attention to any particular item of receipts or disbursements, they being of the usual character, and the statements themselves furnishing full details; and these will be printed, according to custom, as an appendix to this report.

In regard to the vested fund, it is necessary to mention that in consequence of the payment off of the 2nd and 3rd, and a part of the 4th 5 per cent. Govt. Loans, a portion of the Society's

Securities, to the extent of 7000 Rs. has been transferred to the 4 per cent. loan; in consequence of which, the total amount of Notes in the hands of the Govt. Agent, now stand in the sum of Co.'s Rs. 22,333-5-4 against Co.'s Rs. 22,368-10-8 last year.

The arrears of subscription at the end of 1852, as stated in the last report, amounted to Rs. 6,693-3-9; of this the sum of Rs. 3932-15 has been collected during 1853, leaving a balance of Rs. 2,760-4-9, of which Rs. 844-14-9 may be considered as irrecoverable, being composed of the arrears of defaulters, deceased and insolvent members, and of some who have altogether retired from India. The balance of these arrears, after the above deduction, is Rs. 1,915-6-0 which, being added to the unpaid subscriptions of 1853, forms a total due to the Society of Rs. 6,336-12-6, as explained in lists 1 to 4 annexed.

The liabilities of the Society are Rs. 4624, being balance of cost of seeds for the past season; these will be fully liquidated by arrears due for subscription, for seeds, grafts, &c., disposed of by the Society, and the cash balance, which form a total of Rs. 9,886-11-11.

The usual exhibitions of vegetables, fruits, and flowers have been held during the year; the first and second, under tents, in the Auckland garden, the third in the Town Hall. The total amount awarded in the Horticultural department was Rs. 665 and Rs. 254 in the Floricultural department. The first show on 28th January was excellent in respect to vegetables and fruits, and the competition was spirited: but the display of flowers was not equal to that of 1852, nor were there so many competitors. The same remark is applicable, as regards flowers, to the second show on the 8th March, though several well-grown plants were brought forward, and a few novelties exhibited. The assortment of vegetables was good, but the celery though improving in quality, is not yet up to the mark. At the third show, on the 5th April, asparagus and artichokes, which have not hitherto shared in the marked improvement exhibited in most of the other vegetables, were tolerably well represented, and of fair quality. The Orchids were the chief attraction in the floricultural line at this show, and some good specimens of the bulbous and tuberous tribes were likewise submitted.

The demand on the Nursery Garden for fruit grafts, ornamental and useful plants, has been fully equal to that of preceding years. It will be seen from the statement furnished by the Gardener, that ten thousand plants, useful and ornamental, have been distributed, exclusive of a quantity of sugar-cane, and 50 maunds of roots of sorts, such as yams, sweet potatoes, arrowroot, &c., &c. The Society has now a large collection of fruit grafts in store, which it has been determined to dispose of from the commencement of 1854 at half the former rates. It is gratifying to note that the *Victoria regia*, raised from seeds presented by Dr. Wallich in 1851, has been flowering freely: a full report on the subject from the Gardener will be found in the proceedings for September. The *Vanilla* plants *(aromatica* and *grandiflora)* have fruited freely, but the produce has not attained maturity, having been nipped by cold during November and December. Large supplies of pea and maize seed have been raised and distributed to Members, as also seeds and plants of the American Sumach. With the view of improving the stock, the Society have indented on the Saharunpore Botanic Garden for a supply of Peach grafts of the best sorts; a collection is also on its way down from Mr. Glover of the Civil service, who has kindly contributed it from trees growing in his garden at Mooteeharee, Champarun, which, he states, produce fruit equal to any he has ever tasted in India. The Society is again indebted to several Members for contributions, more especially to Sir Lawrence Peel, Messrs. Emerson, Manley, F. Pereira, Burton, Booth, G. Bartlett, and B. Warwick. It may be added that a portion of the garden, which is retained for peach cultivation, was under-drained in May last, and the system having been fairly tested during the rainy season, has been found to answer admirably.

In connection with this subject it may be stated that the Government of India have authorized Mr. Fortune, who is at present in China, to obtain for the Society as large a supply as procurable of grafts of the best sorts of Chinese fruit trees, and a collection of such other plants, useful and ornamental, as are likely to succeed in Bengal. The Society has been in correspondence with Mr. Fortune, on the subject, and the result of this reference, will, it is to be hoped, add considerably to the stock of good plants in the Garden.

Allusion has been made in the last two reports to the project of establishing a Garden on the Calcutta side of the river. The Council regret to state that the plan has not been deemed feasible at the present time, in consequence of the comparatively small amount subscribed, not exceeding eleven thousand rupees, of which only two thousand three hundred rupees have been contributed by the public, and the difficulty of finding a suitable site.

The Vegetable seeds obtained during the past season from North America and the Cape appear to have given satisfaction; but the Council regret to observe that the consignment of Flower seeds from England, from Mr. James Carter, has very generally failed. With the view of obviating, if possible, a recurrence of the disappointment experienced in 1853, it has been proposed to have future consignments later in the season, say in the latter end of October or early part of November, so as to ensure seeds of the same year's gathering. Small trial assortments of French and German flower seeds received from Messrs. Vilmorin, Andrieux and Co. of Paris, and Mr. Van Houtte of Ghent, through the kindness of Dr. Wallich, have also germinated very indifferently.

It was stated in the annual summary for 1851, that the Government of India had offered, at the suggestion of the Society, a prize of Rs. 5000 for the best machine for separating indigenous cotton wool from the seed. The Society appointed a Special Committee in June, 1852, to examine into the merits of the machines sent in to compete for this prize, but, in consequence of unforeseen circumstances, their report was not submitted before the early part of 1853. This report having been lately published in the Journal, it is deemed unnecessary to enter into details in this place: suffice it to say that the Committee being of opinion that, the results of the experiments with the two machines sent from the United States of America by Messrs Carver and Co. and Bates Hyde and Co., both of Massachusetts, were satisfactory, and that they found much difficulty in awarding to either a degree of merit over the other, the Government decided on dividing the reward equally between them, and the Society have awarded a gold medal to each.

During the past year the Society has published three parts of the first volume of the "Indian Agricultural Miscellany" in Bengali; (to which a reference was made in a previous summary) containing papers on practical subjects regarding arrowroot, Guinea grass, tobacco, tapioca, teak, and the cultivation of certain vegetables, viz., potato, asparagus, artichoke, &c. These have been distributed gratuitously, but it is proposed to make a small charge, equal to one half the cost price, for future numbers.

Among other subjects that have engaged the consideration of the Society during the past twelve months, the Council would refer more especially, *First,* to communications from Dr. Riddell, Capt. Geo. Hollings, and Major Meadows Taylor, regarding the extract obtained from the Mŭddār plant (*Calotropis Hamiltonii*) which, it has been surmised, may form a substitute for Gutta Percha for some of the purposes to which that useful article is applied; and the fibre procured from the same plant, which has been considered of such superior quality by the Society's Committee, that specimens of it, as also of the Mŭddār extract, have been forwarded to the Society of Arts for information and report. *Secondly,* to the "Rheea" fibre, *Bœhmeria nivea,* (which has been alluded to in previous reports) of which some exceedingly fine specimens, prepared under the superintendence of Major Hannay at Deebroghur in Upper Assam, were brought to the notice of the Society by the Board of Revenue. A portion of this superior raw produce has been transferred to the Chamber of Commerce at Calcutta and Leeds, with the view of bringing it more generally to the notice of the mercantile community here and in Great Britain. *Thirdly,* to the more extended application of Munject *(Rubia Munjista)* to economical purposes; and to the green vegetable dye of China. Specimens of Garancine prepared by Mr. Henley from the Munject, have been furnished to the local Chamber of Commerce and the London Society of Arts; the other matter has been referred to the particular attention of Mr. Robert Fortune, with the request of the Society that he will endeavor to ascertain the plant from which the substance in question is obtained. The above, with other useful papers on caoutchouc, New Granada paddy, cotton, wool, tobacco, and various fibrous articles, have been published during the year in Parts 3 and 4 of Vol. VIII. of the Journal.

Statement of Receipts and Disbursements of the Agricultural and Horticultural Society of India from 1st January to 31st December, 1853.

RECEIPTS.

From Members, subscriptions collected during the year, Co.'s Rs.		17,913 8 0
,, Government of India, for prizes awarded to Messrs. Bates Hyde, and Co., and Messrs. Carver, and Co., for Cotton-cleaning Machines,	5,000 0 0	
,, Government, annual donation,	1,045 0 0	
,, The Most Noble the Marquis of Dalhousie, annual donation for the year 1853,	500 0 0	
,, Government monthly allowance for 12 months, at 135-13-6 per month,	1,630 2 0	
,, Sir Lawrence Peel, annual donation,	400 0 0	
		8,575 2 0
,, Accruings of interest on fixed assets,		910 12 8
,, Proceeds of Sugar-cane delivered from the Nursery Garden, including cost of packing,	44 2 9	
,, Ditto, of Mango, &c., grafts, ditto from ditto,	307 3 0	
,, Ditto, of a proportion of surplus Cape and American vegetable and English flower seeds, and fruit seeds, of 1852-53,	1,959 0 0	
,, Proceeds of German and French flower seeds,	348 0 0	
,, Ditto, of copies of the Transactions of the Society,	18 0 0	
,, Ditto, of copies of the Journal,	35 4 0	
,, Ditto, of old seed boxes, &c.,	16 9 0	
,, Members, amount of freight, &c., repaid on boxes of seeds forwarded to their addresses in 1852-53,	79 4 9	
,, Members, amount repaid for postages and packing charges for seeds, &c.,	43 2 6	
,, Assignee Estate Alexander and Co., being the amount of sixth dividend at the rate of one anna and 3 pic per 100 Co. Rs. due on the claim of the Society of S.Rs. 24,783-14-8.	19 5 9	
		2,869 15 9
Total Receipts Co.'s Rs.		30,269 6 5
By Balance in the Bank of Bengal on 31st December, 1852,	871 13 7	
,, ditto in the hands of Government Agent ditto,	322 2 4	
,, ditto in the hands of Secretary on ditto,	14 6 6	
		1208 6 5
Grand Total, Co.'s Rs.		31,477 12 10

DISBURSEMENTS.

FOREIGN VEGETABLE AND FLOWER SEEDS.

By Messrs C. M. Villet, for Cape garden seeds supplied in 1853,	2,045 0 0
,, Mr. D. Landreth, towards meeting cost for American garden, cotton and maize seeds supplied in 1852, amounting to Drs. 1,995-58,	3,103 15 0
,, Messrs Lawson and Sons, for Scotch vegetable seeds supplied in 1852 (*£88 16s 10d*)	870 4 6
Carried over,	6,019 3 6

Brought forward, ...	6,019	3	6			
,, Mr. James Carter, in full for English flower seeds supplied in 1852, ...	1,651	9	0			
,, Ditto, ditto, in part payment of his bill for English flower seeds amounting to £ 251-18 supplied in 1853, ...	1,000	0	0			
,, Dr. Wallich, for a consignment of German and French flower seeds supplied in 1853, ...	513	5	10			
,, Braddon and Co., for a packet of Cape flower seeds, ...	5	0	0			
				9,189	2	4
LIBRARY.						
,, Books purchased during the year for the Library, ...	634	5	1			
,, Binding books during the year, ...	74	2	0			
				708	7	1
PRINTING.						
,, Sundry parties for printing receipts and schedules of prizes for flower shows, circular letters, &c., &c., ...				103	1	6
JOURNAL.						
,, Bishop's College Press, for printing Part 3 of Volume VIII, ...				433	2	0
NURSERY GARDEN,						
,, Ordinary expences incurred on account of the Nursery Garden from 1st December, 1852, to 30th November, 1853, ...	3,327	0	9			
,, Extra ditto, for repairs to Gardener's Bungalow, purchase of fruit seedlings for grafting, for pots and new cart, &c., ..	831	1	9			
,, R. Fortune to meet expences for forwarding plants and seeds from China, ...	500	0	0			
				4,658	2	6
ESTABLISHMENT.						
,, Amount for Establishment from 1st December, 1852, to 30th November, 1853, ...				5,846	9	0
PECUNIARY REWARDS.						
,, Prizes to Mallees for vegetables and fruits at the Exhibitions held on the 28th January, 8th March, and 5th April, 1853,	665	0	0			
,, Prizes to Mallees for flowers at the Exhibitions held on the 28th January, 8th March, and 5th April, 1853, ...	254	0	0			
				919	0	0
INDIAN AGRICULTURAL MISCELLANY.						
,, Rev. Krisnamohun Banerjea, and P. S. DeRozario and Co., for printing Parts 1 and 2, Vol. 1. of the Indian Agricultural Miscellany, ...	117	0	0			
,, Rungololl Banoorjee and Mooktaram Surmano for translating and revising most of the papers, &c., for ditto, ...	62	0	0			
				179	0	0
ADVERTISEMENTS.						
,, Advertising in the Calcutta and Up-Country Newspapers notices of General Meetings, of Shows of vegetables and flowers, distribution of seeds, &c., &c.				373	7	8
STATIONERY.						
,, Stationery for Office books, &c., and for the use of the office, ...	7	0	0			
,, Brown packing paper for packing seeds, ...	373	1	6			
				184	1	6

FREIGHT.		
,, Freight on boxes of seeds, books, &c., sent and received from the Cape of Good Hope, America, &c.		354 4 0
METCALFE HALL.		
,, Society's proportion of Assessment on Metcalfe Hall from Nov. 1852 to October 1853, ...	131 4 0	
,, Sundry parties for various articles of Furniture,...	144 1 4	
MACHINERY ACCOUNT.		
, Messrs Jessop and Co. for cleaning and setting up Cotton Cleaning machines, ...	7 8 0	
, Mr. James Gilbert for assistance rendered to Special Committee for trial of Cotton Cleaning Machines, ...	100 0 0	
, Messrs. Bates, Hyde and Co. and Messrs. Carver and Co. for Government prize of 5,000 Rs. for Cotton Cleaning Machines,	4,962 10 6	
		5,070 2 6
POSTAGE AND SUNDRY OTHER CHARGES.		
, Postage on letters, &c. sent and received, and on copies of the Journal and for petty expences, ...	586 15 9	
, Extra packermen for subdividing seeds, ...	32 7 0	
' For expences incurred in putting up a fence round a portion of the Auckland Circus, for superintending the erection of tents for Flower and Vegetable Shows, ...	163 2 0	
, Presents to Constables for attending at Horticultural and Floricultural Exhibitions during the year, ...	40 0 0	
, Government Agents Commission, brokerage, &c., charges during the year, ...	14 1 11	
		836 10 8
Total Disbursements, ...		29,130 7 8
, Balance in the Bank of Bengal on 31st December, 1853, ...	2,196 1 4	
, Ditto in the hands of Government Agent on ditto, ...	118 13 1	
, Ditto in the hands of Secretary on ditto, ...	32 6 9	
		2,347 5 2
Grand Total, Co.'s Rs.		31,477 12 10

MEMORANDUM.

Receipts.

By Amount of Receipts during the year 1853, as per Statement, ...		30,269 6 5
,, Balance in the Bank of Bengal on 31st December, 1852, ...	871 13 7	
,, Ditto in the hands of Government Agent on ditto, ...	322 2 4	
,, Ditto in the hands of Secretary ditto, ...	14 6 6	
		1,208 6 5
Total, Co.'s Rs.		31,477 12 10

Disbursements.

To Amount of Disbursements during the year 1853, as per Statement, ...		29,130 7 8
,, Balance in the Bank of Bengal on 31st December, 1853, ...	2,196 1 4	
,, Ditto in the hands of Government Agent on ditto, ...	118 13 1	
,, Ditto in the hands of Secretary on ditto, ...	32 6 9	
		2,347 5 2
Total, Co.'s Rupees, ...		31,477 12 10

Dependencies.

Amount invested in Government Securities lodged in the Government Agency Office, ...		22,333 5 4
Amount of Subscription in arrear, ...	6,336 12 6	
Amount of outstandings for seeds, grafts, copies of the Journal, &c., ...	1,202 10 3	
		7,539 6 9

Liabilities.

Amount due by the Society for American vegetable, &c., seeds in 1853, ...	Sp. Drs. 1,551 97 0=	3,104 0 0
Balance on acct. of English flower seeds, in do.	£ 151 18 0=	1,520 0 0
	Co.'s Rs.	4,624 0 0

ERRATA.

(FOR PART IV OF VOLUME VIII.)

Page,	*Line.*					
193	7 19	from top, ..	*for,*	Bimhur ..	*read,*	Bimbur
,,	8	,, ,, ..	,,	Buramūluk ..	,,	Buramūluh
,,	11	,, ,, ..	,,	as a general ..	,,	and general.
,,	17	,, ,, ..	,,	to a ..	,,	with a
,,	21	,, ,, ..	*insert*	and ..	*after*	bleak
,,	,,	,, ,, ..	,,	(;) ..	,,	uninteresting
194	7	,, ,, ..	*for*	or dry	*read*	and dry
,,	11	,, ,, ..	*insert*	(—)	*after*	abrupt,
,,	13	,, ,, ..	*for*	or difficulty ..	*read*	and difficulty
,,	18	,, ,, ..	*insert*	(,)	*after*	tower
195	7	,, ,, ..	*for*	clearer or ..	*read*	clearer and
196	8	,, bottom,	,,	"Somalho," ..	,,	of "Semalho,"
,,	5	,, ,, ..	*insert*	and ..	*after*	pear,
,,	3	,, ,, ..	*for*	Minadpore ..	*read*	Moradpore
197	4	,, ,, ..	,,	"kuja," ..	,,	"*kuja,*"
198	9	,, top, ..	,,	or starvation ..	,,	and starvation
,,	12	,, bottom,	*insert*	parenthesis ..	*betn.*	as I was told,
199	6	,, top, ..	*for*	hookum, ..	*read*	*hookum,*
,,	10	,, ,, ..	,,	12th mile ..	,,	twelve mile
,,	12	,, ,, ..	,,	paddy ..	,,	paddy fields,
,,	5	,, bottom,	,,	delighting ..	,,	and delighting
200	9	,, top, ..	,,	lavender, ..	,,	*lavender,*
,,	21	,, ,, ..	,,	of *Lilium* ..	,,	for *Lilium*
201	3	,, ,, ..	,,	twenty-three ..	,,	*twenty-three*
,,	16	,, ,, ..	,,	gungoor, ..	,,	Lungoor
,,	19	,, ,, ..	,,	Porchajanah, ..	,,	Poshyanah,
,,	13	,, bottom,	*insert*	(—) ..	*after*	soil,
,,	10	,, ,, ..	*for*	decamped ..	*read*	this one decamped
203	5	,, top, ..	,,	vigorous, ..	,,	rigorous
,,	12	,, ,, ..	,,	entirely ; buried ..	,,	entirely buried ;
,,	7	,, bottom,	,,	"*liher*" ..	,,	"*liber*"
205	17	,, ,, ..	,,	of the ..	,,	of its
206	16	,, top, ..	,,	or antiquated ..	,,	and antiquated
,,	9	,, bottom,	*dele*	(,) ..	*from*	maize
207	5	,, top, ..	*insert*	(:—) ..	*after*	dainty,
208	10	,, ,, ..	,,	(,) ..	,,	Now

Page,	*Line,*				
208	9 from bottom,	*insert*	(,)	.. *after*	was
„	3 „ „ ..	„	(,)	.. „	*consequences*
209	3 „ top, ..	*for*	it in	.. *read*	them in
„	7 „ bottom,	*insert*	(,)	.. *after*	extensive
211	2 „ top, ..	„	( )	.. *to*	two varieties
„	5 „ „ ..	*dele*	to admire,	.. *after*	charms
„	9 „ „ ..	„	in a	.. *read*	in the
„	11 „ bottom,	„	thing soon rotted.	„	thing rotted.
212	7 „ „ ..	„	an unmixed species,	„	an able species.
213	6 „ „ ..	„	by the host of	.. „	by a host
214	6 „ „ ..	„	sage," on	.. „	sage ;" which on
215	9 „ „ ..	„	institutes,	.. „	Institutes,
„	5 „ „ ..	„	which, the	.. „	which, under the
216	first line, ..	„	or other	.. *read*	and other
„	14 from top, ..	„	" *Zyanut !*"	.. „	" *Zyarut !*"
„	15 „ „ ..	„	" Achahul,"	.. „	" Achabul,"
217	5 „ bottom,	„	winds	.. „	wind
„	2 „ „ ..	„	tides, flood	.. „	tides of flood,
218	first line, ..	„	one night from	.. „	in one night after
„	12 from top, ..	*insert*	(,)	.. *after*	buried
„	16 „ „ ..	*for*	stock	.. *read*	stack
219	2 „ „ ..	„	pay	.. „	*pay*
„	10 „ „ ..	„	farthest	.. „	furthest
„	18 „ „ ..	„	these	.. „	they
„	21 „ „ ..	„	or with any	.. „	(or with any other
„	22 „ „ ..	*dele*	(	.. *before*	including
„	2 from bottom,	*for*	white	.. *read*	*white*

JOURNAL

OF THE

Agricultural & Horticultural Society

OF

INDIA.

EDITED BY

THE COMMITTEE OF PAPERS.

VOL. VIII.

Calcutta:

BISHOP'S COLLEGE PRESS.

M.DCCC.LIV.

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THE JOURNAL

OF THE

Agricultural & Horticultural Society

INDIA.

On the application of the Beet-root drying process to the Sugar-cane, as an improved and economical method of producing sugar: and on the probable suitability of such a manufacture to the climate and circumstances of Bengal.

By T. F. Henley, Esq.

I have the pleasure to forward herewith, for being submitted to the Society, some specimens of dessicated sugar-cane
gar-cane at four shilling of preparation, together with six samples
manufacturer of the present day canes prepared by this method.
sugar has not been produced more cheap the saccharine con-
application of improved processes to the manufac tabular form,
cane have never yet, however, been made in India. The drying process, of which we now treat, may probably in due time effect important changes in the resources of the country on this head.

It will be observed in these experiments that the China variety of cane produced not only the greatest amount of extract, but also of the best quality; and this result, with this description of cane, I have invariably found to be the case. It accords with my impressions that it is to the middle provinces of Bengal, such as Benares, Azimghur, Mirzapore, Oude and surrounding districts, including perhaps Tirhoot, that we should look as the proper field for such a manufacture as is here treated of; for in all these districts, the small, hard, varieties of cane resembling the China, are grown, and although too generally despised by European planters in favor of the larger exotic varieties, (better suited undoubtedly for ordinary mills,) the former are in reality superior, well adapted to the climate, produce excellent sugar, and are, moreover, equally well suited to the drying process as the fine showy looking exotics.

The subject of economical methods of producing colonial sugars now assumes additional interest in consequence of the great improvements which have taken place in the beet-root manufacture in Europe, threatening the very existence of our colonial commerce in that staple. Amongst the most remarkable improvements in the beet-root manufacture, the dessicating process merits the first attention; through its aid the manufacturer is now enabled to continue his operations of extracting sugar from the beet-root throughout the whole year, instead of being confined as hitherto to some 3 or 4 months of the season. It is now about ten years since I called attention to the subject of dried sugar-cane as an object of manufacture well suited to the circumstances of Bengal, in a letter dated Mauritius, 3rd April 1842, and published in the Calcutta Journal of Natural History.* I forwarded at that time specimens of dried Mauritius canes, from which crystalline sugar was obtained by Doctor McClelland, thus establishing the fact so far, that sugar-cane, properly prepared, may be kept some three or four months, and even endure a voyage, and still give up its sugar when required. I paid much attention to the subject at the time; the failure however of the French experiments in the West Indies, made on a large scale, led me to abandon the subject as hopeless. It will be recollected that the French Government gave permission to a certain company to introduce into France, free of duty, 4000 tons of dried sugar-cane, and very talented engineers and manufacturers were sent out for the purpose of establishing the manufacture. From some cause or other, which I have never been able to ascertain, the operation was not successful. This fact should be borne in mind at present, that the drying process as applied to the sugar-cane has not been so far successful. It is at the same time necessary to bear in mind that, at the epoch the experiments were made with cane, the operation had not been successful in Europe as regards the beet-root, with which the process originated. It is only latterly that the method has been improved to such an extent that it now ranks amongst the established economical processes;—this is the point to which I now wish to call the attention of the reader. Whatever has been done in reference to the beet-root, may certainly be accomplished with the sugar-cane. The structure of the latter is less spongy—the quantity of water to be evaporated much less—its elements much purer, and the deliquiscent mineral salts (the sources of the deterioration which takes place under certain circumstances,) in far less proportion. All circumstances are much more favorable for the cane than for the beet, and in addition, we have in the provinces more particularly pointed at, a hot sun and dry atmosphere generally, during the cane season, through whose powerful assistance, in all probability, three-fourths of the necessary evaporation in drying the cane, could be accomplished, or at least so as to reduce the expense of combustible and mechanical drying apparatus to a comparative trifle with what takes place in if laid out in the sun on a dark surface or sheet of iron. They will be then found crisp and brittle, and easily pulverized or passed through a grain-mill so as to reduce them to something resembling saw dust. Having got so far, take a glass tube or piece of lead pipe of 3 feet in length and ¾ inch bore, tie a piece of coarse muslin over one end of it, and then pour in about 9 inches deep of refiner's bone charcoal, over this place the dry cane powder, which may be put in as closely as possible. On to this arrangement pour clear cold water, which will slowly percolate through the tube, carrying with it in its passage every thing soluble, and a syrup may be drawn off from the little apparatus of a density of 22,° and as limpid as water. To obtain a complete analysis of the cane, water should be poured on, until the liquor flowing from it becomes perfectly tasteless. The syrup thus obtained may now be evaporated down to proof in any convenient vessel capable of holding about half a pint. The liquid in question, although so beautifully clear to all appearance, will still require to have about half an ounce of lime water added to it, when an abundant scum will be thrown up. Should the operator not have refiner's animal charcoal, as I have recommended to be employed, it may be dispensed with. By knowing the weight of the vessel in which the syrup is concentrated, and weighing the same with its concentrated syrup together after the operation, we will ascertain the amount of extract he has obtained from the quantity of cane operated on.

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*We reprint this letter to make the information more complete.—Eds.

It should be borne in mind that the manipulation of small quantities of syrups is attended with some difficulties, and requires experience to obtain a well crystallized product. The mass should be placed in the sun so as to maintain its temperature, the crystals may then be washed with strong spirit to remove the molasses.

With these simple details I trust the subject may be taken up and investigated by persons favorably situated for the manufacture. These favorable circumstances will be found, I repeat, most probably in the middle Provinces, already the great centre of production for the best Indian sugars.

There is not any machinery called for in the drying process which may not be made and kept in repair in the country;—a couple of hot air chambers and a blowing fan, with bullocks for the motive power, and such an apparatus as is already employed for baleing cotton. This would form the most expensive part of the machinery, and as it would be essential for many reasons that the material should be packed in hard bales, say of 380lbs. each, or six to the ton, it would be necessary that proper arrangements were provided for this head. On the small scale, indigo screws might be made available, but only for experimental purposes.

It is not contemplated that the cane manufacturer would attempt any of the ulterior processes; that had better be left to those having vaccuum pans and establishments: a simple agricultural manufacture only is proposed.

On the head of the economic value of the article perhaps a few words may be made of some use in the enquiry. At present, only an approximate valuation of course can be made. But assuming that cane costs Rs. 2 per ton, the expense of the dry material, including drying, package and transport to Calcutta, would amount to 30 Rs. per ton, in all probability:* and the value of the article, in consideration that such raw material having suffered no deterioration from fire or fermentation, and being such as would produce at once in the vaccuum pan commercial sugars of the highest class,—I

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* *Pro forma Estimate.*

Cost of 4 tons of cane, @ Co.'s Rs. 2, ...	Co.'s Rs.	8	0	0
Drying ditto, @ Co.'s Rs. 1, ...		4	0	0
Packing, marking, &c. per 1 ton in 6 bales @ 1 R. each, ..		6	0	0
Freight and charges to Calcutta as for native raw cotton Rs. 30 per 100 mds., ...		8	0	0
Unenumerated charges, ...		4	0	0
Per Ton, ...		30	0	0

say,—I should value such an article at Co.'s Rs. 50 to 60 per ton, and which would be remunerative to the refiner at present prices.

Goosery, near Calcutta: 13th March, 1852.

Extract of a Letter from T. F. HENLEY, ESQ., *dated Port Louis, Mauritius, 3rd April* 1842, *to* GEORGE JAMES GORDON, ESQ., *Calcutta.*

Since I had the pleasure of forwarding you a box of samples of produce of this Island, by the *Exmouth,* favored by Mr. Bell, and got up as is often the case in like circumstances in a hurry; it occurred to me that I might have at same time excluded a specimen of much interest. I now endeavour to make up for the omission, in forwarding to you a sample of the Sugar-cane of the Island, thoroughly dessicated and powdered, so that you will have in Calcutta in most complete preservation a portion of the Island cane, minus its aqueous portion. I believe I took occasion in a former letter to notice to you, that previous to the researches of the French chemists, (at least previous to my knowing any thing about their operation,) I had been occupying myself in analysis of the sugar-cane, and was so struck with the difference between the absolute contents of the sugar-cane in saccharine matter, and that obtained by the ordinary process of manufacture, that some of my friends treated the thing as absurd, whilst others more reasonably, came accompanied by the specimen of canes they desired to analyze, and waited personally to observe the result. Soon after this, I learnt that similar researches had been made by Peligot in France, who, struck also with the great difference in the yield of cane scientifically treated, and by the ordinary colonial processes, had aided in getting up a company for the exportation of cane, with permission from the French Gorvernment to introduce into France, free from duty, eighty millions of pounds of dried cane. The difference of produce may be estimated by the fact, that our Island sugar-cane contains from sixteen to twenty-two per cent. of sugar and syrup, whilst by the ordinary methods of manufacture, from eight to twelve are the limits. Peligot in his analysis gives eighteen per cent. of *bonâ fide* crystallizable sugar as the contents of the cane, with ten to twelve per cent. of woody matter; and states, that the cane juice is a simple solution of sugar and water, and is *altogether crystallizable*. This latter observation does not coincide with my repeated researches. But there can be no doubt, that there is less uncrystallizable sugar in any given quantity of cane, treated by the dry process, than when treated in the ordinary method. The violent crushing action of our cane mills, by creating a great exposure to atmospheric oxygen, evidently occasions some change in the relations of the elements of the cane, and the trifling difference which exists between gum, sugar, starch, &c., will afford some insight into the causes of the change which does actually take place; for the quantity of molasses or uncrystallizable sugar is very much greater, than when the saccharine matter is properly extracted without crushing the cane. Our Island process gives from 100 parts or pounds of cane, fifty to sixty lbs. of cane juice, forty to sixty of trash, whereas this latter should be but ten or twelve. The difference being the loss, besides a larger portion rendered uncrystallizable. The drying method may be applied to any extent of operations, and some questions arise affording subject for reflection, such as the dried and powdered cane being compressible into bales might be sent home, and run directly through the superior processes of the European refiners; or, as it contains more than half its weight of sugar, why might not the poor employ it directly. A portion placed in a bit of open muslin, and put in a cup of tea, yields its sugar instantly to the fluid, without any foreign or ill flavor whatever. If you will take a portion of the dry cane I now send you, and pour it lightly into a ¾-inch glass tube, say six or eight inches deep; on pouring a little cold water over it, clear syrup will run through by the method of displacement, until nothing but water comes off; by pouring the latter syrup in a fresh portion, a concentrated syrup will be obtained. This is the method to employ on the large scale, operating on tons at a time. It is remarkable that the native manufacturers obtain more saccharine matter from their canes in the relation of twenty to fourteen, as I have found at Barripore and Benares, &c., &c., than the best European steam mills. The natives water their cane-trash, but the tedium of the process decomposes the subject, and in some instances in short nullifies the advantage they gain. The method of drying the cane for manufacture is peculiarly applicable to Bengal; for I found in Benares, Azeemghur, Gazeepore, &c. that the *small hard* country cane only yields ⅓rd of its weight in cane juice, the refuse ⅔ds, containing locked up a very large proportion of valuable matter, which cannot be touched by the very best steam mill. In fact, no crushing process can extract the juice completely, even from the more tender canes of this Island. I frequently amuse myself in making sugar from the trash coming from a good ten-horse mill, as a proof, by synthesis of the improved method. I think the drying process one of great interest to Bengal, and one which might lead to very important results.

"Trois produits principaux qui constituent la canne."

Eau........	72.1
Sucre.......	18.0
Ligneux	9.9
	100.0

On the Quinine-yielding Cinchonas, and their introduction into India. *By* Dr. H. Falconer.

The genus "*Cinchona*" is entirely confined to tropical America. There are from 25 to 30 species more or less known to Botanists. Of these 8 or 10 species alone, yield bark abounding in Quinine. The remaining species are either much inferior or valueless in this respect.

The true Quiniferous Cinchonas, so far as is known at present, are limited to the Andes, ranging through Bolivia, Peru, and Columbia, to Santa-Martha, from Lat. 20° South to 11° North. The species occur at elevations varying from 1500 to 10,000 feet above the sea. One undetermined species, from the province of La Paz in Bolivia, is said to grow on a plain elevated from 14,000 to 18,000 feet.

The principal Bark-yielding species occur between 6,000 and 10,000 feet, where, the mean temperature is estimated to average from 59° to 62° of Farh. The trees yielding the best barks are found in dry, rocky situations, at the greatest heights and in the coldest regions. The same species of Cinchona is said to be so much affected by situation and increase of temperature, as to alter the habit of the tree and produce an entirely different quality of Bark: low and hot vallies deteriorating its virtues so greatly, that it is rejected by the merchants as unfit for commerce. *(Pöppig.)*

The inferior or inert Cinchonas are found in New Grenada and in the forests of Brazil. One species, *Cinchona Roraimæ*, has been described from British Guiana, whence its introduction to India by one of the return Coolee Emigrant ships might be easily effected, but in a medicinal point of view it is of little or no value. The same defect applies to the five species which are known from Brazil. The Carthagena barks, although containing more or less of alkaloid principle, are much inferior to the more elevated species, growing in the Andes.

There is another class of what are called "false or spurious Cinchona barks" yielded by American genera, nearly allied to Cinchona, but distinct, such as *Exostemma, Buena* and *Remijia.* These are all known to possess febrifuge properties, in a greater or less degree, although devoid of the several Quinoid alkaline principles met with in Cinchona; and decoctions of their barks are locally used, where indigenous, in the cure of fever.

There are two genera in India closely allied to Cinchona, and which were formerly described by Botanists as species of that genus. The one, *Hymenodictyon,* has a species H. excelsum (*Cinchona excelsa* of Roxburgh) growing in the hilly parts of India, to the size of a large tree, and yielding a bark which is very bitter and tonic, and acts as a febrifuge, although not known to yield any alcaloid like Quinine. Another, *Luculia,* yields a species, L. gratissima *(Cinchona gratissima* of Wallich) growing abundantly in Sylhet. It forms a small elegant tree, and is very nearly allied to Cinchona, but it is not known to possess any energetic medicinal properties.

One South American species, introduced within the last two years, is now growing in the H. C. Botanic Garden. It is the *Cinchona* (Remijia) *ferruginea* from the dry mountains of the province of Mines in Brazil. It yields the "Quina da serra" or "Quina de Remijo," which is substituted as a febrifuge for true Cinchona bark, in Brazil.

The species most desirable for introduction into India are,

Cinchona condaminea } before all others;
Cinchona micrantha, }
and then, Cinchona nitida,
Cinchona lancifolia,
Cinchona lucumafolia,
Cinchona ovata,
Cinchona lanceolata,
Cinchona pubescens,

Cinchona cordifolia,
Cinchona magnifolia,

with two or three others still undetermined.

The species of this extensive genus are so closely confined to the tropical region of America, that we need hardly look in India, beyond the corresponding parallels of Latitude, for suitable sites for their introduction into this country. It does not seem that the required conditions of climate are to be met with in the mountains of the North-West Provinces, so far North as 30,° and therefore success is not to be expected, in the Hills about Simla, Mussourie or in Kumaon. Dr. Royle has entertained the subject already, and I entirely concur in the opinion, expressed by him, that the best situations for a trial are presented by the Khasyah Hills, the mountains behind Chittagong, and the hilly parts of Upper Assam. The experiment might also be extended to the hilly tracts around Darjeeling. The Neelgheries and the higher elevations of the Western Ghats, appear to offer the most promising situations for Southern India.

The object is of much interest, and well worthy of consideration. But the procurement of the species, and their safe delivery in India, are by no means matters of easy attainment. Great obscurity, and contrariety of opinion among Botanists, attach to the species, in relation to the numerous varieties of Bark, known in commerce. Humboldt, although long resident in the Cinchoniferous regions, was not only unable to clear up the subject, but, on the contrary, added to the confusion of the species by the great authority of his name. The valuable species have never yet been introduced into Europe, and there are no means of procuring the seeds with any certainty as to the kinds, through any local agency at present existing in the Cinchona-yielding provinces of South America. Her Majesty's Garden at Kew, with its own ample resources, and the far-reaching help of the foreign office, has not yet been able to effect the object. The only species, that has been introduced into India, so far as the records of the H. C. Botanic Garden shew, is the "Cinchona (Remijia) ferruginea" (above referred to) within the last two years, and that a species of inferior value. The unsettled condition of the South America republics, and the evils attendant on that state of things, are against the attainment of the object, by the ordinary channels of intercommunication in such cases. The only way to accomplish it with certainty, would be to depute an intelligent and qualified Gardening Collector from England for a couple of years to South America. His attention to be mainly given to an exploration of the Cinchona forésts in the different provinces, and to procuring an ample stock of young plants and seeds of all the best species. The chief reliance would be upon the young plants, which might be collected in a Depôt in the West Indies, either at Trinidad or Demarara, and thence brought to India in Ward's cases upon one of the return Coolee ships, under the charge of the Collector himself, upon whom every responsibility would devolve until the delivery of the plants in India. The seeds as collected might be despatched viâ England. But not much reliance could be put in them, as a source of supply, as the seeds of this family are in many cases (the Coffee for instance) very perishable and short-lived: Coffee seed will barely outlive the voyage from Ceylon to Calcutta.

The method proposed here would be attended with considerable expense. But it is the only one that would afford any certainty of effecting the end in view, and it is constantly practised in Europe in similar cases. The Royal Kew Gardens and the London Horticultural Society, singly or conjointly, or in partnership with wealthy English Collectors, yearly depute qualified gardeners, to remote or little explored countries, to secure the introduction of desirable or important plants. The *ivory palm* of Brazil, of which the nut is now so much used in the arts, was for upwards of 40 years a desideratum in England, and it is only within the last 7 or 8 years, that the plant was procured by means of a Collector deputed for the object. The best varieties of the China tea plant were still a desideratum in India, after the Himalayan Nurseries had been 12 or 14 years in existence; and it was only by deputing Mr. Fortune from England to China, in 1848, for the express object, that the best varieties were with certainty procured. The end in view was most satisfactorily accomplished, and this probably could not have been effected by any other means. The method was expensive, but the results were worth more than the expense.

The successful introduction of the true Cinchonas into India would unquestionably be of very great importance. Besides furnishing at little cost an invaluable, and at present costly, medicine, to the people, a new product for export, in very large demand, would be added to the resources of the country. But to accomplish it would be accompanied with a good deal of expense: and in entertaining the question fairly, it is best to give due weight to this consideration at the outset.

H. C. B. GARDEN: *13th Feb.* 1852.

Memorandum on the Victoria Regia, Water-Lily, in the H. C. Bot. Garden. By MR. ROBERT SCOTT, *Head Gardener; Associate Member Agri-Horticultural Society.*

(Communicated by Dr. Falconer.)

On the 18th September last, the Secretary of the Agri-Horticultural Society, intimated a request to be put in possession of a few details connected with the Victoria Regia, for submission to the Society.

At that time it was considered advisable to defer giving an account, which obviously would have been incomplete, until the plant, then flowering, had seeded.

Now that this water-lily has produced a fair crop of apparently good seed, three of which are germinating, has passed through the cold season with comparative impunity, and is showing symptoms of increasing vigour, opportunities have been afforded, extending over a period of nearly twelve months, for observing the plant through all the stages of its development, and forming deliberate opinions on its habits, growth, flowering, &c.

Without rendering this paper tedious with minutely detailed accounts, I may be permitted to state generally, that the H. C. Bot. Garden owes its contributions of Victoria seed to Chatsworth, Her Majesty's Gardens, Kew, and the Agricultural and Horticultural Society of India. The office books record the receipt of two despatches from Chatsworth, three despatches from the Royal Gardens, Kew, and two despatches from the Agricultural and Horticultural Society of India.

On the 20th March last, the second batch of Victoria seed was received from Chatsworth; on reaching Calcutta, one of these seeds was found sprouting; this seed produced our present plant which was planted out 26th May, on a hillock of prepared earth in one of the garden tanks. By the end of June, the plant had established itself in its new situation. The leaves produced in July, reached an average diameter of 2 feet 8 inches, and were usually fully grown on the seventh day after their appearance on the surface of the water. During the subsequent months, the average size of the leaves, and the usual time occupied in development, were as follow :—

August, 3 feet 1 inch, average diameter, attained in 6 days,
September, 3 feet 4 inches, ditto ditto, ditto in 6 days,
October, 3 feet 8 inches, ditto ditto, ditto in 10 days,
November, 4 feet, ditto ditto, ditto in 14 days.

In December and January the plant was partially resting; during these months four leaves only were produced, each of which averaged 4 feet 1 inch in diameter. The entire number of leaves, from first to last inclusive, fifty-eight, thirty-six of which had been produced up to the 5th September, when the first flower-bud opened. The forty-second leaf (18th October) was the first to show the rim; the largest leaf at mature growth measured 4 feet 2 inches (on 5th November), and had been seventeen days in completing its growth. The largest flower opened 30th December, and measured sixteen inches across.* The flower-bud opens partially about sunset on the second or third day after its appearance above water, and finally expands on the following evening; the first, or partial, opening is effected rapidly, and may be witnessed; the colour at this time is a near approach to white, which gradually changes to pink, while the fragrance is delicious and quite perceptible at a considerable distance from the plant. Only one flower-bud opens at once, although two, and occasionally three, flower-buds have been seen at a time on the plant.

Such is a brief account of the growth and flowering of this celebrated Lily since its introduction into the H. C. Botanic Garden. Something however yet remains unaccomplished; I allude to the *size* of the leaves which are said to reach as much as 6 feet 5 inches in diameter on plants in the river Berbice. I see no reason why the Victoria growing in Bengal should not, in size of foliage, ultimately equal the Victoria growing in British Guiana. The largest flower produced by the Botanic Garden plant surpasses in size any recorded either by Schomburgh or by Bridges.

An interesting aquarium might be formed, containing Victoria Regia, Euryale ferox, Nelumbium speciosum, N. speciosum album, N. luteum, Nymphœa alba, N. rubra, N. Cœrulea, Limnocharis Humboldtii, N. Plumiere; the sides of the aquarium to be occupied by Pontedera lanceolata, tropical Sagittaria, Richardia æthiopica, Papyrus antiquorum, and the various species of Arum and Caladium. The effect of such an arrangement would be striking enough, and deserves a trial by cultivators who possess the taste and means.

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* The total number of flowers produced—thirty

H. C. B. GARDEN: *4th March,* 1852.

NOTE BY DR. FALCONER.—Since the above remarks, by Mr. Scott, were written, the Victoria plant, which was the subject of them, has died off. The leaves and flowers first became much smaller, and at last disappeard; and on the evening of the 4th May the stem of the dead plant was found floating on the surface of the tank. On examination the lower half of the rhizoma or bulbous stem, was seen to be decayed and quite putrid, while some vitality still remained in the upper half: but the decay was in progress of propagation upwards, and no treatment at this advanced stage could, in all probability, have saved the plant.

The same results have happened to the Victoria plant which was kept in the aquarium of the Royal Botanical Society's Garden in the Regent's Park. From a notice contained in the Gardener's Journal of the 7th Feb. last, it would appear that the plant was put in the aquarium on the 19th Oct. 1850, and on the 22nd Jany. 1852 the dead stem was found floating on the surface, after having yielded, between the 16th March and the 14th Nov. 1851, 73 flowers.

The death in both cases was owing to the peculiar habit of the plant. The subaqueous stem is a short, thick, soft and fleshy rhizoma, which grows erect and has no permanent or independent roots. The leaves are developed spirally, in close approximation to one another, so that their thickened persistent bases overlap each other, forming irregular projecting knobs upon the rhizoma, something in the manduring the stem of a date tree. These persistent projections each bear two scars. The upper one, nearly circular, and indicating the line of detachment of the fallen leaf; the lower, upon the sloping under-side of the projection, composed of a net-work of contiguous hexagonal pits, each bounded by a raised rim, something like a honeycomb. Each pit bears in its centre the remains of a fascicle of vascular bundles, and indicates the base of a distinct root. Each leaf, in this manner, is supplied with its own distinct arrangement of roots which are sent downwards in bundles, and undivided, while the lower extremity of the bulbous rhizoma has no root whatever, independent of those emitted from the base of the leaf stalks. As the leaves die, the roots belonging to them gradually decay; and the lower part of the stems rots, while the upper is raised higher and higher out of the soil in which it is planted, by every successive development of leaves, till the base is at length rotted off the mound upon which it is originally planted. The roots of the uppermost and youngest leaves, while this process is in progress, in finding their way down to the muddy soil, have to pass along putrid matter derived from the plant itself; the plant gradually suffers, the change being indicated by a reduction in the size of the leaves, and at length dies off. It has in consequence been proposed to take up Victoria plants every year, at the end of the flowering season, to remove carefully the decayed or putrid portion at the base, together with the decayed roots, and to plant it afresh on a new mound, or on fresh soil raised upon the old mound.

These remarks and hints are thrown out for the guidance of those who may attempt to grow the Victoria Lily in India. They will be forewarned to provide against the tendency to decay which is inherent to the plant in consequence of its peculiar habit.

H. C. B. Garden, Calcutta: *6th May*, 1852.

Report from the E. I. and China Association on certain specimens of Cotton, raised in India, from acclimated Mexican seed.

In September 1850, the Cotton Committee of the Society, reporting on various musters of cotton raised in different parts of the country from acclimated Mexican seed, of the 9th generation or descent, recommended (see Vol. vii. p. 211) that certain of them should be forwarded for the opinion of the East India and China Association. They were despatched accordingly, and the following is the report thereon, received from the Association in September 1851:—

East India and China Association:
London, 18*th July,* 1851.

A. H. Blechynden, Esq., &c. &c.

Sir,—I have the honour to acknowledge the receipt of your communication of the 23rd April last, as also of the cotton musters to which it refers. And I am desired by the Committee of this association to assure you of the interest they take in the subject. They have placed the whole in the hands of Messrs. James Cook and Co., as one of the most competent cotton brokers in this city for their careful inspection and report: and I have the pleasure to subjoin copy of it.

I am, &c.
Geo. Saintsbury, *Secretary.*

To G. Saintsbury, Esq., *Secretary,*
London East India and China Association.

Sir,—We duly received your letter of the 14th instant and the samples of cotton to which it refers, and have now the honour, for the information of the East India and China Association, to enclose a report on the different qualities, and their probable value in the market at the present time. Cotton in the seed, as it appears in many of the samples, is almost without value, and could never with propriety be sent home for sale in that shape. We have endeavoured in our valuations to state as near as we can, from the character and length of the staple, what the cotton, when divested of its seed, would be likely to fetch; but you are doubtless aware that good cotton may be easily spoiled by careless or injudicious cleaning.

40 MINCING LANE : We are, &c.,
28th June, 1851. JAMES COOK AND CO.

"B."—[Raised at Banda and forwarded by M. P Edgeworth, Esq., Collr. of that district.]	This kind of Cotton might answer the purpose of good Bengal. The staple degenerated from the original stock and become short and uneven. There is a little stain and seed, the present value being about 4½*d.* ℘ ℔.
"C. 4"—[Raised in the neighbourhood of Allahabad (village produce) and forwarded by R. Lowther, Esq., Commissioner of Allahabad.]	Staple fine, and longer than that of B. Much would depend on the mode of cleaning, and if so done as to preserve the staple it would be worth 5½*d.* ℘ ℔.
"I. 1." and "I. 2."—[Raised at Chittagong by A. Sconce, Esq. C.S.]	I. 1.—Bright colour, and very clean; the staple tolerably strong, but rough and uneven. Value 5*d.* I. 2.—Much the same as the sample marked C. 4.
N. 1. N. 2.—[Raised in Upper Assam from imported American seed, termed "Protective," and submitted by H. Mornay, Esq. Secretary Assam Tea Company.]	N. 1.—Would answer the purpose of middling bowed Georgia: very clean, good colour, and with more staple than any of the preceeding samples: value 5½*d.* ℘ ℔. N. 2.—If well cleaned would rank well with middling bowed Georgia. Rather whiter in colour than N. 1.

J. J.—[Raised in the skirts of the Rajmahal hills and forwarded by J. Pontet, Esq.]	Fine, long staple, and in this respect has a marked superiority in quality. If properly cleaned, and the staple preserved, it would rank with fair Orleans Cotton, and be worth 6½*d.* ⅌ ℔.
G. 1.—[Raised at Chota Nagpore, and forwarded by the late Lt.-Col. J. R. Ouseley.]	Mixed and uneven in staple. Probable value 5d.
L. 1. L. 2. L. 3.—[Raised at Cawnpore by the late Mr. J. G. Bruce.]	L 1.—Bright colour, good stout staple, and very clean; worth 6¾*d.* to 7*d.* being better than fair Orleans. L. 2.—Much like the other Seeded Cotton. L. 2.—Very much like N. 2. and the same valuation would apply.

Report from Mr. Thomas Teil, *on the tanning properties of the gum of the "Dhak" or "Pulass" tree, Butea frondosa.*

With reference to your letter of 30th June last, and as promised in mine of the 4th July, I now submit for your information, the result of a trial and test of the tanning qualities of two seers of "Dhak Pulass," which accompanied your note for that purpose.*

On examination of the substance, it at once struck me, that the color of the gum itself would prevent the possibility of its being used largely as a tanning substance, and moreover, that it also consisted of too large a proportion of gummy matter, to admit of its astringent qualities readily combin[illegible] with the animal skin.

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* This specimen was presented by Mr G G. Mercer of Eta —Eds.

The accompanying piece of a small calf-skin after being subjected to the unhairing process, and prepared in the usual way for the reception of tannin, was, on the 15th of July, emersed in a decoction of the "Dhak Pulass," which I found readily soluble in cold water; the decoction was changed at intervals, as is usual, four times, each succession of liquor being increased in strength to that which preceded it; each liquor I found to darken in color, in proportion to the time it was exposed to the action of the atmosphere.

The skin during the process was constantly worked and attended to, and would, with like care, have been thoroughly tanned in 5 days with Babool bark. I consequently, on the 21st July, cut a piece off the skin to dry out, and see if it really were tanned, and although it was highly colored *through*, and had all the appearance of being thoroughly tanned, yet, after being well washed, as is usual in currying, and dried out, it became as hard and as impliable as a raw skin. I concluded therefore, that although it was highly colored through, that little or no tannin had combined with the skin. Not willing to give the matter up, I continued the tanning process, adding gradually, as I thought was required, more of the substance until the 1st August, when I tried another piece of the skin by drying out, and with the same result as the first,—from thence to the 15th and 25th August, respectively, when, having consumed the whole of the 2 seers sent, I finally dried out what remained of the skin, and found it to be scarcely one-third tanned. It is therefore, in my opinion, of no use as a tanning substance, in the state of the sample sent; but it might perhaps be worthy of attention as a dyeing substance (for its color seems very fast) or for tanning, could its astringent qualities, which are considerable, be easily deprived of so much coloring and gummy matters.

KIDDERPORE TANNERY: *1st Sept.*, 1851.

⁂ With the view of making the information on the above subject more complete, we reprint from the Journal of the Royal Asiatic Society of G. Britain and Ireland, the following paper by Professor Solly, entitled "Experiments on the Dhak Gond, a natural exudation of the *Butea frondosa.*"—

This substance, which although it differs in some particulars from the Kino which is found in the shops, yet as it agrees in its most important properties with what has so long been described under that name, it is most convenient to call it *Butea Kino.*

It is of a brilliant ruby red colour, transparent, and very brittle. It consists principally of small round tears, and other fragments, which from their form appear to have been detached from the lesser branches of the tree. When it has been kept for some time, it becomes opaque and dark coloured, this however may be prevented, according to Dr. Roxburgh, by preserving it in well-closed bottles. I have examined two specimens of this substance, one brought over by Mr. Beckett, and the other received from Bombay. There was considerable difference between the two, but from their properties it was evident that they had been originally similar. The following description is equally applicable to both specimens, except where it is otherwise stated.

When exposed to heat, the Butea kino swells up, emits fumes which are partially inflammable, and then ignites; if after that it is removed from the source of heat, it continues to glow like tinder, until nearly wholly consumed, a very small portion of a white ash only remaining. Ten grains of the kino, carefully selected as to purity, were ignited in a covered platinum vessel, and retained at a red heat until all the carbonaceous matters were burnt; there then remained 0.45 grains of white ash, a very small portion of which was soluble in acids with effervescence, the remainder consisted principally of silica and alumina. The specimens of Butea kino were far from being in a state of purity, being mingled with small fragments of wood, bark, and also with earthy impurities: these were evidently derived from the mode of collection, which most probably consisted in gathering from the ground under the trees the fragments of the natural exudations which had fallen from them. The impurities in the specimen brought over by Mr. Beckett varied from 12 to 25 per cent., of which from 4 to 6 were earthy; that from Bombay contained in general far more impurities.

It swells and slowly dissolves in the mouth, having a pure, strong, astringent taste, like the finer kinds of catechu. It has no smell. In cold water it swells, and slowly imparts to it its fine red colour; after some time, only the outer portions of the kino remain, which by exposure to the air had become dark coloured and almost insoluble in water, whilst the whole of the interior and unaltered kino is dissolved. These insoluble portions consist principally of difficultly soluble extractive. A sufficient quantity of boiling water dissolves the whole, and on slowly evaporating the solution, the difficultly soluble extractive separates in tough red films.* The quantity of this extractive of course varies considerably in the two specimens, and influences their solubility. The Bombay variety is far less easily soluble in water, and clear solutions are much more difficult to obtain when made with hot water; they are very apt to become turbid, and if strong, gelatinise on cooling; and if the water contained any saline or earthy substances, this was almost certain to take place. From these circumstances it is rendered very probable that the sample from Bombay had been exposed to the air for a longer time than the other; it was most likely collected at another period of the year, after having remained exposed to the air, damp, and light, for some time. From the description of the properties of the exudation when fresh, and only just become hard, as given by Dr. Roxburgh, in 17—, it is evident that it should be only collected at that period, as it is then far more applicable to useful purposes, whether in medicine or the arts, than after exposure to the air, &c. Both alcohol and pyroligneous spirit dissolve a considerable portion of the Butea kino, but far less than water. Ether dissolves but little, and remains colourless; when a portion of ether is agitated with a strong aqueous solution, it soon becomes thick, and, on evaporation, yields a considerable portion of tannin.

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* This also takes place with the kino of the shops.

A small quantity of pursulphate of iron changes the colour of the aqueous solution to a dirty green; a rather larger quantity occasions a copious green precipitate.

A series of experiments were made on the effects of various reagents on solutions of this kino, with a view to ascertain which were the best precipitates of the red colour, either for dyeing, or as a pigment.

Solutions of most acids, and acid salts, changed the colours to a light orange, and for the most part occasioned copious precipitates; they were nearly all of a dirty yellow or orange colour.

When a few drops of a strong solution of caustic potassa were added to the aqueous solution of the kino, the colour was immediately altered, and very much improved, becoming of the most splendid crimson; when, however, a little more of the solution of potassa was added, the colour rapidly became gray, and a copious precipitate fell. It very quickly became dark reddish gray, and nearly the whole of the colour was destroyed. Caustic soda and ammonia likewise improved the colour in the same way. When acids were added to solutions thus precipitated, so as just to neutralise the alkali, some of the precipitate re-dissolved, and the rest became orange. Carbonates of potassa and soda both very much deepened the colour of the solution: it was however not to be compared in beauty of colour with the solution obtained by the addition of a small quantity of caustic potassa, and had a slight brown tinge. In general, most saline solutions occasioned precipitates which were either pink, gray, or colours between the two. Acetate of lead, as well as several other metallic solutions, precipitated the whole of the colouring matter. The precipitate obtained by adding a solution of alum either to a neutral solution, or to one containing a small quantity of alkali, was of a dirty pink colour. When gelatinous or recently precipitated alumina was agitated with any of the highly coloured solutions, it soon abstracted all the colouring matter, but the lake so formed was, like those formed by precipitation, of a dingy colour. The precipitates formed by metalic solutions were of very variable hues, but in no case were the colours so obtained decided or brilliant. Attempts were likewise made to fix the colour in the fibre of cotton, silk, wool, &c., in various ways, and with different mordants; the colours were all imperfect, dingy, and variable in colour, but they were very permanent. This agrees with the results obtained by Dr. Roxburgh, but as his experiments were made on the fresh substance, they were under more favourable circumstances. The cause why these colours cannot be well employed is, that the red colouring matter is so intimately combined with the tannin and gum, that whenever the one is precipitated, it carries down the other also, and hence, when we endeavour to precipitate the tannin alone the red colour or extractive is always precipitated with it: this, as will presently appear, is in some cases a great inconvenience.

A solution of gelatine produced in aqueous solutions of the Butea kino, an abundant precipitate of tanno-gelatine, which always contained a portion of colouring matter: this varied very considerably between the two portions of kino, that from Bombay containing by far the most: when a solution of the kino from Mr. Beckett, either in cold water, or still better, in alcohol, was precipitated, the tanno-gelatine contained very little colour. The solution, after the separation of the precipitate, contained gum, extractive, gallic acid, and minute portions of other matters: the quantity of gallic acid was very various, but in no case did it appear to exist in any considerable proportion.

It was difficult to ascertain the exact per centage of tannin, as it varied very much in different specimens submitted to examination. I have therefore repeated the experiments on several portions, and shall now give the mean of some of the best results obtained.

One hundred parts of the rough kino from Mr. Beckett were dried for 6 hours at a temperature of about 130° Fahrenheit; they lost 13.23 parts of water. Much of this water was derived from the wood, bark, and impurities, for the pure substance when separated was far less hygrometric. The kino thus dried was digested in water kept nearly at the boiling point, until a strong solution was made; this was then poured off, and the process repeated with fresh portions of water, until all the matters soluble in that fluid had been thus removed. The residual matters, consisting only of impurities, weighed 17 parts. The solutions were then rapidly evaporated to a considerable degree of concentration, during which 3.5 parts of difficultly soluble extractive fell down. It was necessary to complete this evaporation as rapidly as possible, because if the hot solution was long exposed to the air, it became much darker coloured and was somewhat altered in properties. The solution was then precipitated by a strong solution of gelatine, of which 28.3 parts were employed. The precipitate, when collected, washed, and carefully dried, weighed 79 parts; by subtracting from this the weight of the gelatine employed, the proportion of matter precipitable by animal jelly is ascertained to be 50.7. This was of course principally tannin, but it contained a portion of coloured extractive which gave to it a dark colour, varying in depth with the circumstances under which the solution was made, &c. The remainder of the solution, after the separation of the tannin was evaporated, contained gum, a small quantity of gallic acid, extractive, and minute traces of saline and earthy matters, weighing in all 15 parts. The Bombay kino contained less tannin and rather more gallic acid and extractive, and by long continued boiling with free access of air, the composition of either kind might be easily modified. If this substance were to be employed in the arts, it would be very probably most convenient to obtain it as an extract, unless by so doing it became much darker in colour. By dissolving the tannin by cold water, I have obtained extracts in which the per centage of tannin was as high as 75°, and sometimes even higher; but these extracts were made under the most favourable circumstances, being prepared with rapidity and the least possible exposure to the air. It would be utterly impossible to manufacture the extract in the large way in this manner, if the causes above mentioned do not prevent it, but it might very probably be advantageous to prepare the kino of the Butea as an extract, as the cost of freight would be therefore less.

From the large per centage of tannin which this substance contains, as indicated by the above experiments, and from its probable cheapness, it promises to be of considerable value in the arts, and especially in that of tanning leather. As a substitute for the astringent substance now in use, its adoption in many cases from convenience or economy are self-evident, and require no comments; but in the art of tanning leather so many points require to be considered, that it is necessary *to say a few words on that subject. On putting a piece of* pelt or prepared skin into a strong solution, it soon absorbed a considerable quantity of tannin, but, at the same time, became *of a rather dark colour; this is an unfortunate quality*, because, as the consumers of leather judge of its quality in part from its colour, the tanners do not like employing anything which deepens the colour too much. The colour taken up by the leather of course varied with the solution employed, a cold solution of the kino from Mr. Beckett giving a much lighter coloured leather than a hot-made solution; that from Bombay gave a darker colour, and the solution was very subject to gelatinise and become turbid; this of course would be a great inconvenience. The leather tanned with this kino was very hard and rather brittle, but it was tanned with considerable rapidity. These results were obtained on small pieces of thin skin, and I do not anticipate that it will answer at all for tanning such skins; its richness in tannin however promises well for tanning thick hides; and the results of experiments on its application to this process, now in progress, will be communicated on a future occasion."

Further remarks on Coffee cultivation at Hazareebaugh. *Communicated by* MR. C. WHEELER.

I was always most anxious to keep the A. and H. Society *au courant* with the progress of my Coffee cultivation at this station, and my long silence on the subject has been entirely owing to adverse circumstances. Indeed, if I may so express myself without being guilty of egotism, the almost insuperable difficulties I have had to contend with over the last two years, have been such, as I doubt not, would have induced many men, if similarly trammelled, to have deserted the project in utter disgust and despair. Instead of causing me to relax in my efforts, it acted as a stimulant to renewed exertion; and I am proud and happy to inform you, and through you (if you consider such information worthy of its notice) the Society, that I have fought through all impediments, till at length, victory has crowned my efforts. In my prior communication* (a long time ago), I believe, I informed the Society of the partial failure of my first plantation of 4,000 plants. Owing to my not having been able to get the land in proper time, (it ought to have been ready for the reception of the plants at the commencement of the rains, whereas I did not get it till September 1849,) and scarcely any rain falling after the transplantation took place late in September; and owing to the erroneous manner of planting in holes, 3 feet deep, and 18 inches diameter, filled with black earth and sand, (a process I was persuaded to adopt at the instigation of a friend, against my own judgment) which earth being looser than the proper soil, allowed the water (they were watered) to fall below the root of the plant, without touching, or affording it any nutriment; and the soil not being firm enough for the roots of the plant to take a firm hold of it, before an unusually cold and frosty season came on, they were all frost-bitten to such a degree that they never recovered it: and I had the mortification to see them, one after another, shrivel and die, till not above a hundred of them, which were partially sheltered by a hedge, remained alive. In June 1850, through the death of my best friend, who had hitherto supplied the means of my progressing with the experiment, I was left with nurseries containing many thousand plants with scarcely any hope of ever being able to turn them to any account. I had previously advertised, offering to dispose of the nurseries in shares, but without success. Indeed, I had tried in many ways to secure the means of progressing with my experiment. I was almost induced to leave my nurseries to their fate, and desert the station. At this crisis, as a last resource, but I must confess with little confidence that any thing good would be the result, I represented my exact position to a gentleman whom I had previously communicated with on the subject of my efforts in Coffee cultivation. I told him I had a very good Bungalow (my own), and 50,000 Coffee plants of various ages in my own nurseries; and offered to sell my whole estate for a certain consideration, and still continue to superintend its progress, which I was too much interested in, as the thing of my own creation, to desert, if it could possibly be avoided. I was successful. This gentleman purchased my estate, and enabled me to remain comfortably where I am, and in superintendence of the experiment.

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* See Vol. VII. p. 275.

I have about one hundred trees in my nursery which bare their first crop last year, the produce having been about ¼ pound clean coffee each, or rather more, (I sent you a small quantity of the seeds,) which are now bearing their second. The trees are for the most part (there are exceptions) literally laden with berries, though they have been subjected to severe trial through the last hot season, which, according to the oldest and most intelligent natives, has been the hottest experienced in these parts these 25 years past. Some of the trees most exposed to the sun were actually scorched as if they had been frost-bitten. They were slightly watered during April and May, and till the 10th June, when the rains set in, after which they soon recovered all their former freshness and luxuriance. What surprised me more is, that as an experiment, I left about fifty seedlings of last year fully exposed to the scorching sun, (the remainder, many thousands, were under a shed,) only watering them every evening, and, as a proof of the hardness of the plant, not more than 10 or 12 perished. I have carefully observed the blossoming of the plants and formation of the berry this season, and have much pleasure in furnishing the results of my observations. Some of the trees appeared in full blossom as early as the beginning of March, others not till more than a month afterwards. The tree becomes literally covered with almost innumerable blossoms, which appear between every two leaves, all along the lengthy horizontal branch, presenting a most beautiful appearance, particularly where it occurs in a succession of trees. A large plantation, when in blossom, must from a distance present the appearance of little hillocks of snow covering the whole space. The tree remains in blossom some seven or eight days, the flowers gradually withering and falling off, leaving no appearance of any formation of the berry. In from 12 to 15 days or less (the time varies in different trees) it blossoms again, and quite as luxuriantly as at first, shedding its flowers as before, without producing any perceptible result. The same process occurs a third time, and even in some trees a fourth, over more than 3 months, and yet there is only here and there a few berries produced on each tree. Though I could observe no sign of berries forming where the blossoms had fallen off, it is evident they had formed. I saw in the beginning of April some berries had formed on most of the trees, on some more, some less, but not many were perceptible on any. In the middle of the month, more made their appearance, after the trees had blossomed the second time, and as the trees continued blossoming until their final blossoming, as late as the end of June, though many berries had formed on most of them, and here and there, one had attained a considerable size, still there was no appearance at that period of any thing more than a very scanty crop, and I began to despair of the trees producing any thing like equal crops each year; all along the branches at the spots where the blossoms had fallen from, there appeared little black withered tufts, which seemed to me as if the blossoms, or rather their generative properties, had been scorched. In short, I thought I might bid good bye to any thing like a good crop; though I found that berries still made their appearance here and there. I have, however, been very agreeably deceived in my surmises. After about the middle of July, I observed berries forming at many of these, as I supposed, withered, dead, tufts, and before the end of the month each branch was gradually becoming full of them; and so they have continued accumulating at the black tufts ever since, and even at this day, though such a considerable period has elapsed since the last blossoming of the plant, there are now numerous berries forming daily.

In this little history of the blossoming, and fruiting of the Coffee tree, what appears to me, and I dare say will to others, surprising, is the great length of time it continues blossoming and re-blossoming; then the long period which elapses between the appearance of the first berries and the last; some having attained their full size, while some are only just now forming, and others yet to be formed, which must necessarily cause much diversity in the periods of their arriving at maturity and ripening, and in this respect, cause the operation of plucking to take place two or three times at least, for there are berries of many sizes on every tree, and it is impossible they should be all ripe together. Last year, I know they were not all equally ripe at the same period, though the berries will hang on the tree for a long period after they are ripe, without fear of their falling; unless, indeed, a strong wind, which is not likely to happen at that time of the year, were to occur. From the experience of over 4 years, I have arrived at the following conclusions which may be depended upon. First;—that one year-old plants, if irrigated once a day (every evening) will, in any ordinarily hot season, survive, without shade and without fear of loss. Second;—that plants of two-years growth will endure the hot season with less irrigation than the former, and without shade. Third;—that plants of three years will endure with less irrigation still than the former; that, if well irrigated, many of them will begin to fruit, and a few of them even if very scantily irrigated. Fourth;—that plants of four years will survive the hot season without shade, or irrigation, without the least fear of their perishing; but if not watered, either naturally or artificially, during the hot weather, they will not blossom and fruit so plentifully as they will otherwise. Fifth;—that (as far as my experience of rather more than four years enables me to judge) a plantation would produce without irrigation after the fifth year, and very fairly too, but would still produce more certainly, and abundantly, if irrigated during the hot months; and furthermore, that the increased produce from watering, unless it were very difficult and expensive to procure sufficient water, either by bunding, or sinking wells, would render the process amply remunerative: in short pay for it over and over again in the course of years. Sixth;—that the Coffee tree in these parts lasting in full bearing over 20 years, or more, and producing an increased crop the larger it becomes, (and I believe it does not reach its full growth till the 10th year) renders the pursuit here very different in its prospects and results, from the same pursuit in Ceylon and other countries, where, so far as I can learn, it seems to attain to its age of maturity, and decay at a much earlier period.* Finally, the principal expences and risk of forming plantations here, consist in preserving the plant for the first 3 or 4 years, by shade and irrigation, (which, although, it will, as I said before, survive without, it is much the better for,) laying out ground, and planting out nurseries, after which a moderate establishment kept up during the year for keeping your plantation clean, and drawing, and laying on the water, and a few extra hands for irrigation, during two or two and a half months of the year, is all that is required. As my communication seems to have run to a tiresome length, I shall only tell you I have for the last two months been preparing my lands, planting out, and providing for irrigation, by bunding a large nullah forming one boundary side of my plantation (not yet above half finished). Since I obtained the pottah of the lands, which was not till the 21st June last, I have exerted myself to the utmost to get as many plants as possible out before the end of the present month; but, added to my having obtained the land too late, (and here and there it had been sown with a small grain called Goondley, it ought to have been all ready for planting out by the 1st June) we have had very little rain here this season, as yet, and for the last 15 days more, so that I have been obliged to discontinue my transplanting; provision for artificial watering not being made, which ought to have been in readiness last year, has stopped the operation. You will gather from the above that I have, as usual, many disadvantages to contend against. I do not however despair of ultimately overcoming them all. When my trees are all out, I believe my plantation will be the largest experiment yet made in the Bengal Presidency—about 50,000 trees. It is quite sufficient to test the long disputed question—namely, will Coffee cultivation in the Bengal Presidency prove remunerative or not?

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* There are Coffee trees in the Ameers' gardens which the Governor General's Agent, Captain Simpson, assures me he knows to be 17 years of age, and, so far from presenting any appearance of decay, are most luxuriant; and I can bear witness to one of them having 3 years ago borne more than 1 maund of uncleaned berries: I believe much more than a maund, because I obtained from it about 25 seers for seeds, and it appeared full of berries after these were plucked. The trees seem likely to continue bearing many years yet to come.

HAZAREEBAUGH: *August 17th*, 1851.

Report on Wool from Shanghai Sheep, bred at Chittagong.

By JAMES COWELL, ESQ.

In a letter, dated Chittagong, 13th March 1851, forwarding specimens of various products which he thought might be interesting to the Society, Mr. Archibald Sconce, C.S., writes:—

"One article is Wool cut from sheep that Capt. Marquard brought from Shanghai. The sheep are large bodied animals, tall and long, the wool seems to be long and fine?"

The sample in question was handed to Mr. James Cowell, merchant of this city, who has favored the Society with the following report on it:—

"This wool from Shanghai sheep, viâ Chittagong, is a very good specimen, being long, soft, and easily combed, which leads me to infer that sheep wool may form an article of export from the Northern Ports of China, at no distant period. This sample is not assorted,—head, belly, and back, being all mixed together, which it should not be. It is therefore difficult to affix a value to it, but I think, and my opinion is confirmed by a friend practically acquainted with the article, that it would fetch at home, in its present condition, from 10*d.* to 11*d.* p. ℔. Sheep should be washed in a running stream before being sheared, the omission of which has caused the present sample to be dirtier and more discoloured than it would otherwise be. I fancy that a cross between a Merino Ram and Chinese Ewe, would much improve the wool, and the experiment might probably be worth the time and attention of some of our countrymen in the Northern Ports of China.

CALCUTTA : *April 1st,* 1851.

Remarks regarding Sterculia fœtida, (the "Junglee Badam" of the South of India), and the oil expressed from the seed.

In March 1851, Mr. Archibald Sconce submitted for the opinion of the Society a packet of seeds, with specimen leaves of the tree producing it, and a communication on the subject to his address, from Mr. J. C. Bruce of Chittagong. Mr. Sconce remarks,—"the tree is found on the coast towards the South of Chittagong." Dr. Falconer, to whom the seeds and leaves were referred, recognized them as belonging to *Sterculia fœtida,* the common "Junglee Badam" of the South of India. Mr. Bruce remarks that the trees from which the seeds were obtained are fully thirty feet high and grow very straight. The seeds are produced in large pods,—three, four, or five, joined together, with a rough velvet coat outside, red on the side exposed to the sun; they are in shape and appearance much like green peaches; and within these pods are found the seeds, about six in each.

The seeds were transferred to Mr. William Haworth, a member of the Society's Oil and Oil-seed Committee, who has furnished the result of his experiment in the following communication to the address of the Secretary:—

"Herewith I send you two bottles of oil, the produce of the seed of the "Junglee Badam" or *Sterculia fœtida,* as you named it in your note to me. I also hand a statement of the produce. Should you think proper to produce it this evening before the meeting, I would recommend you to exhibit at the same time a quantity of the seed; if you have a whole pod, so much the better. I consider the produce good, and the oil valuable for many purposes.

There is a little more labour required in extracting the kernel from the seed than in castor oil making; in other respects the process is just the same. I also send a portion of the oil cake, from which more oil of an inferior quality might be got by putting it through a second process.

Memo. of produce.

	Br. Md.	*srs.*	*chs.*
Original quantity of seed, ...	1	2	0
Which produced of clean kernel, ...		22	0
And of husk and sweepings, ...		20	0
Produces of unboiled or raw oil, ...		6	5
———————cake		15	4
Loss in weight, ...		0	7
		22	0

Four seers of the above oil was boiled to extract the water, as in the manufacture of castor oil, and produced seers 3-2 of oil, fit for the market. The remainder, or "kutcha oil," is kept as first extracted to test its keeping qualities; it now appears to be getting a little rancid, although not more than 10 days old. A bottle of each marked "boiled" and "unboiled" is sent herewith.

19*th April,* 1851."

A few remarks on the soil, climate and state of horticulture at Peshawur. *By* CAPT. F. C. BURNETT, *Bengal Artillery.*

I will now tell you a little of this place as it may interest you. The soil is excellent, being all alluvial and rich, but the climate is the most difficult to manage, for at one season it is as cold as England and at another it is hotter than India; of course this puzzles gardeners not a little, and yet I have succeeded in having finer vegetables and flowers than I have seen in India, and quite equal to the best English. I can hardly tell which to specify since all have been so good; the most extraordinary are the beet-roots, they are immense and perfect in every respect, I have had some very fine roots grown at Cabul, and brought over here for sale in the cold weather, but they are not near so delicate as those grown here. I have also vegetable marrows of several sorts; the bush squash is very large, some larger in circumference than a soup-plate; the tomatos are magnificent, as well as artichokes, asparagus, onions, leeks, different sorts of *Dolichos*, and indeed *every* vegetable both Indian and English. My cauliflowers last season were the wonder of every one here; I have kept about a seer of seed, which is eagerly sought after. I cannot say much for the fruit; it is very abundant, but no pains taken to improve it by either grafting or pruning; the seed is put into the ground and it is allowed to take its chance; notwithstanding I have seen very fine peaches and plums, for of course some of the seedlings must be fine. The grapes do not seem good, but this is of no consequence, for we are well supplied from Cabul. Pears, apples, and quinces, are also grown in abundance, but are all inferior, purely through neglect. I have had some apples and apricots brought from the mountains of Teera that were very fine; I have done my best to procure trees from thence for the purpose of grafting, but without success. If you like, I will make a small collection of seeds for the Society of all sorts. I wish it was possible to get some of the American fruit trees up here, but I suppose that would be almost impossible.

PESHAWUR: *3rd June,* 1851.

Report on musters of Cotton from Chota Nagpore and New South Wales, and on a muster of Tobacco from Chota Nagpore.

TO THE MEMBERS OF THE COTTON COMMITTEE.

GENTLEMEN,—I have the pleasure to submit for your opinion two samples of cotton; namely;—

A. Sample of "kupass," received from Capt. Haughton, Assistant Agent, G. G., S. W. F. (through Mr. Piddington), from what stock not stated, whether indigenous or foreign, but having the appearance of Bourbon or degenerated Sea Island; and,

B. A *minute* sample, submitted by Mr. W. Haworth, on behalf of Mr. James Hall, as the production of N. S. Wales from American seed,—description, not mentioned.

A. H. BLECHYNDEN, *Secy. A. and H. S.*

METCALFE HALL: *22nd July,* 1851.

Extract of a letter from CAPT. HAUGHTON, *Assistant Agent, G. G., S. W. Frontier, to* H. PIDDINGTON, ESQ.

"With these specimens I forward a specimen of cotton. Its chief merit lies in the fact that it is sown on rugged trap hills, on which other cultivation is impossible, where it gives a crop for three or more years successively. I do not know if it is common elsewhere, but do not remember to have seen it in India. I send also a specimen of our tobacco; as far as I can judge from the odour, it seems to me particularly good.

If you think them of interest you can make them over to the Agricultural Society."

Minute by MR. JAMES COWELL.—I have examined the samples of Cotton *A* and *B*.

The *A* "*Kupas*" is an excellent and useful description, the fibre strong and soft and of some length. From its being so readily and easily divested of its seed (black), and from its general appearance, I consider this specimen to have descended from Bourbon stock, but to have degenerated in some degree. It will be well to learn from Captain Haughton whether much of this cotton is grown in the district under his charge, under what kind of cultivation, and the price per maund at which it sells or can be produced. It is a description of cotton well suited for the home markets, and if properly cleaned and at a moderate cost would readily, I think, meet buyers in the Calcutta bazar.

The *B. sample* from New South Wales (N. E. Quarter) is too small to admit of a particular examination, but it appears to be from American descent, probably N. Orleans, the staple is very short, and silky, and, I think, the cotton has been pulled from the pod before maturity. Without a larger muster I cannot pronounce any decided opinion as to its general merits and suitability for the English market.

The *Tobacco* sample from Chota Nagpore greatly resembles the Cuba leaf; the leaf is small but close grained, fragrant and delicate, indicative of a suitable soil and locality; though from its stunted size, I think it has not received much attention in cultivation, and it is, besides, not well cured. Captain Haughton will perhaps be good enough to tell us whether it is from indigenous or foreign stock, and the price at which it sells in his district, also if much of this quality is produced.*

CALCUTTA: *23rd July*, 1851.

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* A reference has been made to Capt. Haughton, through Mr. Piddington, on these points, but the Society have not received further particulars.—EDS.

Minute by MR. WILLIS EARLE.—I beg to return you the two samples of cotton sent with sundry papers for inspection on the 24th instant.

Mr. Willis has cast his eye over these musters and the papers, and I can report for him, briefly, that, in regard to the "*sample* A *Kupass*" from the Chota Nagpore district, he "concurs generally in the favorable opinion given of it, by Mr. James Cowell, in his letter to you, of the 23rd July 1851."

And in respect to the *minute* muster of cotton wool grown in N. S. Wales from American seed, marked *B*, he "considers it inferior (to the above), but that such inferiority may arise from its not being grown on suitable soil, from want of a due supply of water, &c. rather than from being immature when gathered, as cotton will ripen its seed in varying periods from about 4 to 6 months and more, according to situation, soil, season, &c., &c."

A.—Kupass from Chota Nagpore.

Of these I have examined many of the seeds and opened out their fibres, which seem to me fair stapled, and tolerably strong, and so readily parting from the smooth, black, seed, that they would not suffer from the gin or churka. Seeds small, and on the whole rather thinly clad with wool.

If cotton like this can be produced for three years or more 'in succession,' on the same ground,—say 'on rugged trap hills on which other cultivation is impossible,' it appears to be well worthy of cultivation in such places.

It suggests the idea that other lands, of a still more favorable nature, in the same country, may be found and also tried with cotton advantageously,—for they may yield, more abundantly, a crop of superior cotton which will amply repay the higher rent of such land.

B.—N. S. W. cotton sample, weight 5 grains!

The party who is so anxious to have a report on the quality and value of the cotton grown by him in N. S. Wales must surely have sent up a much larger muster than this insignificant one, and it would not be amiss to refer back to Messrs. Hall and Haworth to supply, if they can, a reasonable sample, which of course can be returned to them, supposing it is wanted for despatch to Liverpool.

This cotton, though soft, fine, and silky, seems to be shorter and weaker in staple than that of Chota Nagpore. Though the grower may not have cultivated cotton before, yet, with nature for a guide, he could scarcely make any mistake as to when the pod was ripe and fit to be pulled; assuming then that the cotton was duly gathered, I consider the short period* in which it came to maturity, as *prima facie* evidence of a nature unfavorable both to the quantity and the quality of the cotton wool produced.

Want of a due supply of water, as well as poverty or unsuitableness of soil, would induce precocity and the usual consequences.

P. S.—Parties should never send *less* than ½ an ounce of cleaned cotton, or 1½ ounce of 'kupass,' or seeded cotton, to be reported upon. A few bolls or pods of the cotton are well to send also.

Report by CAPT. A. THOMPSON, *on a description of Rope from Munneepore, forwarded by* F. SKIPWITH, ESQ.

I am despatching to you by Mr. Garstin a piece of rope made by the Muneepoorees, from the bark of some tree. It appears to me to have very great strength, but whether it is equal to coir rope I know not. The shrubs or trees from which it is made are, I am told, plentiful, and are about 6 inches in diameter.

The man who brought me the rope has promised to bring me a bough of the tree and some leaves, and if he ever fulfils his promise I will send them to you. The rope is cheap, for the piece sent you only cost 5 pice, the price asked for it.

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* About 3½ months only, between 12th October and about the end of January.

SYLHET: *2nd August,* 1851.

I have tested the piece of rope herewith returned, and find it rather stronger than our common coir, and about 10 per cent. only inferior to Russian hemp rope. In its present state it is too stiff for running rigging, but were the fibre properly dressed and spun, I think that would be obviated, and no doubt made stronger. Should you get any of the fibre in its original state, I shall be happy to try it. The short piece that is partly broken, gave way at a strain of 400lbs.

I send you a small piece of rope from Singapore. It is also from the bark of a tree, the name of which I cannot find out. It is of a fine, soft texture, and broke with a strain of 460lbs.

CALCUTTA: *24th September,* 1851.

Report on the Tobacco of the Sandoway District, its mode of Culture, &c., &c. By CAPTAIN ALBERT FYTCHE, *70th Regt. B.N.I. Principal Assistant Commissioner, Sandoway, Arakan.*

My attention having been drawn of late, towards the cultivation of the Tobacco plant in my District, and thinking that a description of its mode of culture, &c., &c., may be acceptable to the Society, I have the pleasure to send the enclosed report, as also two samples per H. C.'s Steamer "Fire Queen," of the best description of last year's crop, with a packet of the seed.*

The Tobacco plant is stated by the natives here, to have been introduced into Burmah, and these Provinces, viâ

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* These samples have not, unfortunately, been received.—EDS.

China, and not by India, as generally supposed. This may possibly be correct, though I have not been able to find, as yet, any corroboration of this statement, in numerous Burmese manuscripts I have consulted on the subject, or any mention made of it, anterior to the commencement of the seventeenth century, the period it was first introduced into Hindostan. The name of the plant does not differ much in sound in the Burmese and Chinese languages, in the former it is called Tshā:-peng, and in the latter Tsang-yeng; it is quite possible, therefore, that the Burmese name may be a corruption of the Chinese. Pallas, Rumphius, and others, have stated it, as their opinion, that the Tobacco plant is indigenous to China, and in use there, long previous to the discovery of the new world.

The finest description of Tobacco, grown in these Provinces, is in the Sandoway District. It is a fine herbaceous plant, growing with a firm stem, from four to five and a half feet in height. The leaves are sessile, simple ovato-lanceotate, acuminate, growing alternately at the distance of about two inches from each other, and when young, smooth, viscid, and of a dark-green colour, but become rough, and much corrugated, and acquire a yellowish tint, as they arrive at maturity. The leaves nearest the root, are from eighteen to twenty inches in length, and from eight to ten in breadth, and decrease gradually in size, as they ascend. The root is long and fibrous, stem round, hairy, and viscid, and about two and a half inches in circumference. The terminations of the branches and stem, are clothed with flowers in clusters, of a light pink colour, corolla infundibuliform, calyx half the length of corolla, succeeded by ovate capsules, invested with the calyx, three-celled, opening cross-wise at top, loculicidal, and containing each about eight hundred seeds, reniform, and of a brown colour, which ripen during the month of April.

The soil on which the chief and best portions of the Sandoway Tobacco are grown is on old Chur land, and on the alluvial soil deposited during the S.W. monsoon, by the numerous mountain streams of the Yoma-toung range, which run their short course to the sea. These streams begin to subside early in October, and immediately the soil has become sufficiently dry, it is most thoroughly cultivated by repeated ploughings and harrowings, and every weed and obnoxious substance carefully extracted.

The young plants are drawn when about three inches high, and planted out from two to three feet asunder, in the beginning of November, and come to maturity, according to the nature of the soil, towards the end of February, and all March. When the plants attain the height of eighteen inches, only ten leaves are allowed to remain on each plant, all the extra ones, as also the tops, and all sprouts and suckers, being carefully plucked off, so as to throw all the vegetable nourishment into the remaining leaves; this plucking continuing as sprouts appear, until the final cutting of the crop. The plants, from their early growth to this stage, require constant attention, as they are most liable to be destroyed by a small hairy worm, and a large description of cricket, called by the Burmese Pa-yeet, an insect pest abounding in this Province, and most destructive to young vegetation.

The leaves are considered fit for gathering, when their edges commence to turn of a yellow colour. As fast as the leaves are cut, they are conveyed to as close a room, as can be procured, and suspended upon slips of cane for the purpose of drying. From the open structure of the Burmese houses, this process is however very imperfect, much air and damp, which should carefully be excluded, being admitted, and a quantity of the fine volatile oil contained in the leaves, is allowed to evaporate in consequence. When the leaves begin to assume a brown colour, they are taken down, and sorted into three kinds, according to their length, and strung upon thin pieces of bamboo, thirty leaves on each slip; ten of these slips are then bound together, and constitute one Bo, or bundle. These bundles are then packed one upon each other, and kept pressed down, and in about a month from this time are sufficiently dry for sale.

The following table is the actual produce, &c., of three kanies of three different classes of Tobacco land in this District.

	Area.	Number of plants.	Number of Bo's or bundles of best description of Tobacco obtained.	Ditto ditto ditto good ditto.	Ditto ditto ditto, indifferent ditto.	Total number of Bo's or bundles obtained.	Value of Produce.	Remarks.
Best desctiption of Land, ..	1. Kanee	6000	40	40	40	120	Cs. Rs. 40	The plant never attains the size in the inferior descriptions of soil, that it does in the best, more plants are therefore planted in the former than in the latter. 1 Kanee-1920 square yards, 1 Bo weighs on an average 547 lbs.
Good ditto ditto,	ditto,	7500	20	40	40	100	,, 25	
Indifferent ditto ditto, ..	ditto,	9000	,,	30	60	90	,, 12	

The samples of Tobacco sent to the Society is of the best description, and sells in the Sandoway market at the rate of Co.'s Rs. 10 per maund (bazar), the good quality sells at the rate of Co.'s Rs. 6 per ditto, and the indifferent at Co.'s Rs. 3-8 to 4. The Tobacco imported in Calcutta, as Sandoway Tobacco, is generally mixed up with inferior sorts, grown on the island of Chedooba, and he banks of the Kala-dan river, in the Akyab District. I would be much obliged by having a comparison made with the sample sent (the genuine Sandoway tobacco) with the descriptions grown in other parts of India, and being informed of the price which it would fetch in Calcutta, with reference to the home market.

The Cuba plant has also been introduced both by Captain Phayre and myself into this District, from seed procured from the Society and elsewhere, and thrives uncommonly well, but is not so much valued by the inhabitants, as that of indigenous growth, being considered by them, as very inferior in flavour, consequently very little of it is grown.

I shall be happy to supply the Society with more seed if required.

SANDOWAY, ARAKAN: *January* 15*th*, 1852.

Agricultural Statistics of the Pergunnah of Leia Khass, district Leia. Communicated by CAPT. G. E. HOLLINGS, *Deputy-Commissioner of the Leia Division, in the Punjaub.*

You will have supposed that I never intended to send you the papers that ought to have accompanied my former letter respecting the agricultural capabilities of this district, which is published in the seventh volume of the Society's Journal;—such, I assure you, was not the case, for although I did not, I always intended to do so. They are now sent, and I will say no more about them, except that if any member of the Society wishes for any further information on the subjects discussed, I shall be happy to obtain answers to any questions that may be put to me.

10*th April*, 1852.

Questions regarding the method of cultivation, time of sowing seed, soils, manures, watering, weeding, &c., with average price of grain, cost of wells, bullocks, &c., in the Pergunnah of Leia Khass, district Leia, with the answers furnished by the Tuhseeldar of Leia:—

1*st Question.*—For or regarding which crops is the information collected?

Answer.—The Rubbee or Harr.

2*nd Question.*—What are the principal articles collected?

Answer.—Wheat (red and white), barley, gram, mussoor-dàl, peas, turnips, oossoo, maitree, melons, water-melons, kukree, garlic, tobacco, onions, pepper, hemp, radishes, saffron, coriander.

3*rd Question.*—What is the proper time for sowing the different articles?

Answer.—In the month of Asong, barley, gram, peas, turnips, oossoo, carrots, radishes, and coriander.

In the month of Katik, wheat, maitree, barley, poppy, and hemp.

In the month of Maghur, wheat, mussoor-dal.

In the month of Poh, wheat, saffron.

In the month of Phagoon, melons, kukuree, water-melons, tobacco, garlic, sugar-cane.

In the month of Cheter, sugar-cane.

4th Question.—What kinds of soil are used for cultivation?

Answer.—The best kinds are in the low lands, near the river Indus, and are of two varieties. 1st, sailabeh or land that is not periodically inundated, but which is adjacent to lands that are, and derives benefit from constant moisture. 2nd, kutchee, over which the periodical inundations flow, they are under water for some time during the hot weather, and rains from the end of Harr to the commencement of Asong,—the beginning of July to the end of September,—rich loams over sand. The pukah is the land situated between the kutchee and the desert; the soil is formed of black earth over sand, and is watered from wells, jhulars, tanks, canals, &c. In the desert, the soil is composed of sand: towards the inner edge where the jhund tree grows, which is called the jhundeewallee thul, there is a mixture of earth, which causes the soil to be the most productive of any in the desert. The land round towns or villages, is named Puwar, and the soil consisting of earth and land well manured, is the best, surest and most productive of all. Every article can be cultivated on it.

5th Question.—How long is seed in germinating?

Answer.—Wheat sown in Katik germinates in five days, if it is sown in Maghur in seven, and if in Poh in twenty days. Barley, gram, mussoor-dal, turnips, oossoo, maitree, hemp, carrots, radishes, coriander, in five days; onions in six days, melons, kukuree, water-melons, poppy, saffron, in seven days. Garlic in ten days, peas in ten days, tobacco in twelve days.

6th Question.—What manures are used and when are they applied?

Answer.—The dung of horses, mules, donkeys, cows, sheep, goats, &c.; the urine of camels is considered a very valuable manure, and it is supposed that the ground is benefitted by camels sleeping on it.

The manures are put on the land and ploughed in a short time before the sowings commence, the land having been levelled and ploughed once before. A third ploughing takes place, and the fields are well-watered, before the sowings take place. Farmers who can afford it manure the lands on which tobacco, onions, garlic, and wheat, that is to be cropped green, are grown, when the young shoots have been ten or fifteen days above ground.

7th Question.—How often are the lands watered?

Answer.—Wheat and barley, grown on the pukah, are watered six times; the same number of waterings is given to the lands on the jhundeewallee thul. In the desert the lands are watered four times, the reason given for this is that they are very cold. Sailabeh and kutchee lands are not watered. Turnips have five waterings; sag, maitree, and vegetables in general, are watered as often as possible; melons and water-melons are watered every second day; kukurees require to be watered every day; tobacco, onions, and garlic, are watered every second or third day; carrots, poppies, hemp, and radishes, once in six days. There are some barahnee lands in the desert, and the pukah on which some articles are grown when the rains are abundant.

8th Question.—How often are the lands weeded?

Answer.—Water-melons, poppies, hemp, and cotton, are weeded once; tobacco, sugar, garlic, onions, melons, twice; and kukuree, three times.

9th Question.—How is the succession of crops arranged?

Answer.—In powah lands, there are three crops—1st, wheat or barley; 2nd, tobacco, or onions; 3rd bajree. In the pukah, bajree follows turnips, maitree, tobacco, carrots and radishes. On lands on which, for the rubbee crops, hemp, poppies, onions, and garlic, have been raised, the cultivator may select for the Khurreef crops, bajree, jowar, and sawunk. There is seldom more than one crop in the low lands, sailabeh and kutchee, but when there is a second, owing to favorable circumstances, bajree follows wheat and barley. In the desert there is only one crop.

10*th Question.*—How often are the articles that are green cropped for fodder?

Answer.—In the powah lands that are well manured, if the crop is fit to be cut for ruhseel fodder in the month Poh, cattle are allowed to graze over them, after which the plants are left undisturbed till the grain is ripe; if the plants are cut for fodder, they are cut a second time in fifteen or twenty days; and then, at the discretion of the cultivator, the plants are left to ripen their seed or green cropped a third time.

11*th Question.*—When does the grain ripen, and when is it placed in store?

Answer.—Barley, hemp, turnips, oossoo, carrots, radishes, poppy, maitree, peas, ripen in Cheter.

Wheat, gram, mussoor, ripen in Bysakh.

Tobacco, onions, garlic, melons, water-melons, kukurees, in Harr. The grains that ripen in Cheter and Bysakh, are stored in Jeith and Harr; those that ripen in Harr are brought at once into the market.

12*th Question.*—What proportion does the seed bear to the produce?

Answer.—Of wheat, twenty-four seers of seed are required for each beegah, which produce, according to soil and weather, seven maunds ten seers, six maunds thirty seers, five maunds ten seers, and three maunds ten seers of grain. Fourteen seers of seed are sown on a beegah, from which seven maunds, six maunds ten seers, and five maunds twenty seers are obtained.

Mussoor-dal, twelve seers a beegah, producing seven maunds twenty seers, six maunds ten seers, five maunds, and four maunds; pease, ten seers, produce six maunds and a half, five maunds, four maunds and a half, and three maunds; turnips, six seers, produce seed for future sowing six maunds, four and a half, three maunds, and two maunds and a half; oossoo, one seer, produces four maunds, three, maunds, two maunds ten seers, and one maund and a half; maitree, nine seers of seed, produce seven and a half maunds, six maunds, five and a half, and four maunds.

Barley, twenty-two and a half seers, produce nine maunds, eight maunds, six and a half maunds, and four maunds and twenty-five seers.

Tobacco, no account of seed, produce eleven, nine, eight, and six and a half maunds per beegah.

Onions, no account of seed, produce three hundred and thirty maunds, two hundred and eighty-one maunds, two hundred and twenty-four, and one hundred and fifty maunds.

Carrots, no account of seed, produce three hundred and thirty maunds, two hundred and seventy-five, two hundred maunds, and one hundred and fifty maunds.

Saffron, three seers, produce eighteen seers, fifteen seers, thirteen seers, and ten seers and a half.

Radishes, no account of seed, produce two hundred maunds, one hundred and fifty, eighty-eight maunds and fifty maunds.

Garlic, no account of seed, produce eighty, sixty-five, fifty-one, and thirty-eight maunds.

13*th Question.*—What were the average prices of the different kinds of grain, during the past year?

Answer.—Vide the accompanying statement.

14*th Question.*— What is the cost of making a pucka and a kutcha well?

Answer.—In the desert the cost of a pucka well is three hundred and sixty-nine Rupees as detailed below:—

For digging well, to water, ..	Rs.	15	0	0
Wooden frame for the bottom of the well, ...	,,	6	0	0
Bricks, ...	,,	254	0	0
Labor of masons, ...	,,	30	0	0
Ditto coolies, ...	,,	25	0	0
For digging from first appearance of water to depth of well, ..	,,	17	0	0
Wheels, wood, work, &c., ..	,,	15	0	0
Extras, ...	,,	7	0	0
Total, ..	Rs.	369	0	0

Average depth of well 21½ hands.

N.B. A hand is ten inches.

In the jhundeewallee lands, a pucka well costs Rs. 262.

Digging to water, ...	Rs.	9	0	0
Wooden frame for bottom of the well, ...		6	0	0
Bricks, ...		173	0	0
Masons, ...		21	0	0
Coolies, ...		14	0	0
For digging from water to depth of well, ...		17	0	0
Wheels, wood, &c., ...		15	0	0
Extras, ...		7	0	0
Total, ..	Rs.	262	0	0

Average depth of water 14 hands.

In the powah lands a pucka well costs Rs. 189.

Digging to water, ...	Rs.	6	0	0
Wooden frame for bottom of well,	,,	6	0	0
Bricks, ...	,,	120	0	0
Masons, ...	,,	15	0	0
Coolies, ...	,,	10	0	0
Digging from water to depth of well,	,,	10	0	0

Wheels, wood, &c., ...	Rs.	15	0	0
Extras, ...	,,	7	0	0
Total, ..	Rs.	189	0	0

Average depth of water 11½ hands.

In the puckah lands, cost Rs. 122.

Digging to water, ...	Rs.	4	0	0
Wooden frame, ...	,,	6	0	0
Bricks, ...	,,	50	0	0
Masons' labor and digging to depth of well, ...	,,	25	0	0
Coolies, ...	,,	15	0	0
Wheels, wood, &c., ...	,,	15	0	0
Extras, ...	,,	7	0	0
Total, ..	Rs.	122	0	0

Average depth of water 7 hands.

Cost of a jhular, puckah, ...	Rs.	30	0	0
,, ,, kutcha, ..	,,	20	0	0

N.B. No lime is used in this district.

15th Question.—What is the average price of a pair of bullocks?

Answer.—For the desert the best cattle are required; the first kind cost one hundred and twenty rupees, second kind one hundred rupees, third kind eighty rupees, fourth sixty rupees.

For the jhundeewallee lands the first kind cost eighty, the second sixty, the third fifty, and the fourth forty rupees.

For wells near the town, first kind seventy, second sixty, third fifty, and the fourth thirty-five rupees.

For wells in the low lands and the puckah, and for jhulars, first kind forty-five rupees, second thirty-eight, third thirty, and fourth twenty-five rupees.

For ploughs first kind thirty-five, second thirty, third twenty-five, and fourth twenty rupees.

Average Prices of grain per Rupee

	Wheat.		Barley.		Grain.		Mussoor dal.		Peas.		Moat.		Bajree.		Moong-dal.		Mash-dal.		Goor, sugar		Rice.		Tobacco.		Cotton.		Ghee.		Ossoo oil.		Soft sugar.		Sugar-candy	
1849.	Srs.	C.	Srs.	C.	Srs.	C.	Srs.	C.	Srs.	C.	Srs.	C.	Srs.	C	Srs.	C	Srs.	C	Srs.	C.	Srs.	C.	Srs.	C.	Srs.	C.	Srs.	C.	Srs.	C.	Srs.	C.	Srs.	C.
June, ..	26	0	29	0	26	0	28	0	30	0	22	0	31	0	18	0	15	0	10	0	10	0	12	0	3	0								
July, ..	23	0	28	4	25	8	28	0	30	0	22	0	31	0	18	0	15	0	10	4	10	8	12	0	3	0								
August,..	25	12	29	0	23	4	25	0	25	0	18	0	31	0	19	12	18	0	7	4	11	12	13	0	2	4	2	3	5	10	3	0	2	10
Sept., ..	22	8	27	8	21	8	24	8	24	0	17	8	29	0	18	8	18	0	7	4	12	12	13	0	2	4	2	1½	5	10	2	12	2	9
Oct., ..	23	0	28	0	22	0	24	8	24	0	17	8	29	0	16	8	18	0	8	8	9	0	11	0	2	8	2	4	5	8	2	10	2	4
Nov., ..	25	0	31	0	25	0	24	12	21	4	18	0	31	0	16	0	17	8	11	0	12	12	9	0	2	12	2	6	5	8	2	10	2	8
Dec., ..	25	0	31	0	25	0	25	8	27	0	18	0	32	8	16	0	17	8	11	0	12	12	9	0	2	12	2	4	5	5	2	10	2	4
1850.																																		
Jan., ..	24	0	29	8	22	4	25	8	23	0	17	12	31	0	18	0	16	0	10	8	13	0	10	0	2	12	2	2	5	8	2	7	1	14
Feb., ..	24	0	29	8	22	4	25	8	23	0	17	12	31	0	18	0	16	0	10	8	13	0	10	0	2	12	2	8½	5	8	2	12	2	2
March, ..	26	0	40	8	29	0	26	0	26	0	23	0	32	0	19	0½	15	0	10	8	13	12	10	12	2	14	2	10	6	0	3	4	2	4
April, ..	26	0	40	0	22	0	28	0	30	0	22	8	34	0	20	8	17	0½	10	12	10	12	10	12	2	14	2	14	7	4	3	0	2	0
May, ..	28	8	41	0	27	8	28	0	33	0	22	8	32	0	19	8	16	0½	11	8	10	0	12	0	2	14	2	12½	7	0	2	14	2	0

16th. Question.—When does the shearing of sheep, goats, and camels take place, and what is done with the wool?

Answer.—Sheep are sheared twice a year, once in Bysakh and the second time at the end of Katik or beginning of Maghur; from their wool, blankets are made, and a fine specimen of cloth called sowkar for putting under saddles.

Goats are sheared in the month of Bysakh; from the wool, ropes are made to fasten horses, asses, &c., bags for holding the loads of camels, palans for camels, suleetahs, bags for loads, and borahs.

Camels are sheared in the month Bysakh; from the wool, are made the ropes fastened to the wood in a camel's nose, and put round the necks of animals as an ornament; it is sometimes mixed with the wool of which borahs are made, instead of white goats' wool.

Khurreef Crops.

1st. Quest. Ansr.—Khurreef or Savnee.

2d. Quest. Ansr.—Bajree, joar, moong-dal, mash-dal, rice, beans, cotton, sugar, indigo, kungnee, cheena, suwank, sumokhur, linseed.

3rd. Quest. Ansr.—Bajree, joar, moong, mash, rice, beans, suwank, sumokhur, and til, are sown in the months Harr and Sawun; kungnee and cheena are sown in Badon; cotton and sugar are sown in Phagoon; and indigo in Bysakh; bajree to be cropped green is also sown in Bysakh.

4th. Question.—Answered in the paper regarding the Rubbee.

5th. Quest. Ansr.—Rice, kungnee, cheena, sumokhur, in four days; bajree, joar, beans, suwank, til, germinate in five days, as also cotton and moong; mash sprout in six days; sugar and indigo germinate in ten days.

6th & 7th. Questions.—Already answered.

8th. Quest. Ansr.—Bajree grown in the puwar is watered seven times, towards the desert five times, and three times in the sailabeh.

Joar is watered six times in the puwar; on low grounds, that are not inundated, five times; in the thul nine times. Sugar and cotton are watered as often as possible, and, at least, once in four days; cheena and kungnee every four days; suwank three times. The other articles depend on rain or a rise of water sufficient to flood them.

9*th. Quest. Ansr.*—Cotton and sugar fields are weeded twice.

10*th. Question.*—Answered before.

11*th. Quest. Ansr.*—There are two grasses, kooreah and mundooah, that thrive in the rains; they are cropped four times for horses, bullocks, &c.

12*th. Quest. Ansr.*—Bajree, joar, kungnee, cheena, til (linseed), indigo, are cut in the month Asong; moong, joar, mash, beans, indigo, sugar-cane, suwank, in the month Katik. In the month Maghur, indigo, sugar-cane, sumokhur and cotton. In the month Poh, sugar-cane.

13*th. Quest. Ansr.*—For bajree three seers which produce on the first quality of soil, six and a half maunds, on the second quality of soil four maunds thirty seers, third quality four maunds ten seers, fourth quality three maunds twenty seers. For joar, three and a half seers seed produce :—

1st.	quality soil,	7	maund	10	seers.
2nd.	Do.	6	do.	20	do.
3rd.	Do.	5	do.	20	do.
4th.	Do.	3	do.	30	do.

For moong and mash, four seers seed produce :—

1st.	quality soil,	2	maund	20	seers.
2nd.	Do.	2	do.	10	do.
3rd.	Do.	2	do.	0	do.
4th.	Do.	1	do.	0	do.

For beans, four seers which produce :—

1st.	quality soil,	1	maund	20	seers.
2nd.	Do.	1	do.	10	do.
3rd.	Do.	1	do.	0	do.
4th.	Do.	1	do.	30	do.

Cotton, six seers of seed per beegah yield:—

1st. quality, four maunds.
2nd. Do. three do.
3rd. Do. two and a half do.
4th. Do. one and a half do.

Sugar, no certainty about cutting of cane as seed:—

1st. quality soil, eighteen maunds.
2nd. Do. fourteen do.
3rd. Do. twelve do.
4th. Do. ten do.

There is not sufficient indigo cultivated in this particular district to afford data for calculations: of kungnee and cheena, two seers of seed per beegah yield from two maunds to four maunds and twenty seers of suwank; and sumokhur two seers of seed yield from two maunds and thirty seers to five maunds.

Til (linseed), three seers of seed, produce from one maund ten seers to three maunds.

List of corresponding Months, 1852.

English	*Punjabee*	*Hindee.*
1st January,	19th Poh,	19th Poos.
1st February,	21st Mah,	21st Magh.
1st March,	20th Phagoon,	20th Phagoon.
1st April,	21st Cheter,	21st Cheat.
1st May,	21st Bysakh,	21st Bysak.
1st June,	21st Jeith,	21st Jeith.
1st July,	19th Harr,	19th Asarh.
1st August,	19th Sawun,	19th Sawun.
1st September,	18th Bhudroom,	11th Bhado.
1st October,	17th Asong,	17th Koonar.
1st November,	18th Katik,	18th Katik.
1st December,	18th Maghur,	18th Magh.

Report on a small experimental shipment of "Ram-Til" or "Sirgooja" seed: Verbesina sativa, Roxb: Communicated by A. WALLACE, ESQ.

[The following report is published with the view of making the information contained in a former number of the Journal, (Vol. VII. Part 1,) more complete.]

If the accompanying muster is the "Ramtil" seed alluded to in the report of your last meeting, it may be interesting to you to know that some time ago I made a small experimental shipment of it to London, stating that my immediate object was to get information as to its nature, qualities, and value; and here is the London Broker's report and valuation, viz:—

"We have had the muster of seed per "William" carefully examined, and the following is the report thereon:—

"It has occasionally been imported from Africa as Niger seed, and from Bombay as Kersanee seed, and the present value of the quality represented by the sample is 37*s.* per quarter, taking the value of rape seed at 48*s.* The oil is good, but the yield is only about 16 gallons against an average of about 20 from rape seed per quarter.

"The cake is unfit for feeding, and could only be used for manure, owing to the horny excrescence, and dry, heating property of it. The average weight of this seed is also deficient of that of rape seed 8lbs per bushel, which is of great moment in making calculations for shipment.

"There is no doubt it would meet with a ready sale at its relative value to rape seed."

P. S. This report was dated in March last. My last valuaation of rape seed was 40*s.* 6*d.* to 41*s.*; so that on 24th December, Ramtil, we may suppose, would have declined in proportion.

CALCUTTA: 12*th February*, 1851.

Report on a description of Fibre from Upper Assam, received from Major S. F. Hannay.

I send a parcel of Hemp or Flax from Major Hannay, regarding which he has given me little information. I expected to have found a notice of the specimen in the parcel, but there is none; all that he has mentioned to me regarding it is, that the specimen is from a jungle plant and he would wish you to give him some information as to its value compared with jute.*

21*st September*, 1851.

Minute by Capt. A. Thompson.—This fibre very much resembles our best dressed jute. I much doubt whether it is adapted for rope, but will be happy to try it and be better able to name its probable value.

Minute by Mr. Joseph Willis.—This fibre is very attractive in its appearance. Its silvery bright and clear colour, its great cleanliness and its excellent condition, are well exhibited—much better, indeed, than usually belongs to the great bulk of the jute which is exported to Europe, and hence might, for such reasons, obtain some preferable consideration.

I think, however, there is a little more harshness, or rather, I should say, less of pliancy and compliability in this fibre than in that of jute under apparently equivalent steeping or preparation.

It is possessed of both strong and weak fibres, but in the main seems to have about equal strength when compared with jute.

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* In a subsequent note, to the address of Col. Jenkins, Major Hannay states that this fibre is obtained from *Sida rhomboidea*, Roxb: which grows luxuriantly at Saikwah. Roxburgh remarks (*Flora Indica*, vol. iii. page 177) in reference to *Sida rhombifolia*,—"the bark of this and the last (*rhomboidea*) yield abundance of very delicate flaxy fibres, and I think might be advantageously employed for many purposes. When the seed is sown thick on a good soil, the plants grow tall and slender, without branches, and every way fit for such purposes."—Eds.

It is difficult, if not impossible, to determine its relative value when compared with jute or with the variety of other fibres which have commercial course.

A full trial of it, both by manufacturers and users, under various circumstances, can alone determine its relative value.

Sufficient is shewn to warrant one in saying that if its cost, free on board ship, stood not more than that of jute, that there is fair ground for believing that it would adequately remunerate an adventurer.

It is desirable that we should get more particulars regarding the plant, &c., &c.

Second Report by CAPT. THOMPSON.—I herewith return a dressed specimen of the fibre presented by Major Hannay, and also a piece of line made from the same. After testing the strength of this fibre and ascertaining its indestructibility by water, I am convinced it is not jute. I am not prepared to give it a name. But I think from the length of the staple, its similarity to silk, and its great strength, that it would fetch a high price in England. The line (only half an inch in circumference,) sustained, after exposure to wet and sun for 10 days, 400℔s.

Report on Coffee raised in Upper Assam, and received from CAPT. C. S. REYNOLDS.

In October 1851, Capt. C. S. Reynolds, Principal Assistant to the Commissioner of Assam, forwarded to the Society two specimens of Coffee raised at Tezpore, accompanied by a communication, of which the following is an extract:—

"The sample marked No. 1, contains seeds from trees in my garden; the other, No. 2, contains some from Mr. Bruce's garden. They are sent with a view to obtain the opinion of the Coffee Committee as to their quality and value, and I shall feel extremely obliged if you will procure it for me as early as possible, and let me know the result, as the coffee in our gardens at this station is now beginning to ripen, and

I observe from an article in the Society's Journal, that the seed will not germinate if kept more than six weeks out of the ground after being gathered. I do not know from what stock the seeds now sent have been raised, but I believe I am right in saying that all the coffee in Assam has been obtained from the seeds of some plants raised from the Society's garden."

Report by Mr. James Cowell, *adopted by the other Members of the Committee.—No.* 1, in its unshelled state is a clean good coffee, apparently from Mocha or good Malabar stock; when shelled, the berries appear of regular size and plump, but at its present age, wanting of fragrance. It is a good and useful coffee, and would fetch now in England 50*s.* @ 52*s.* ⅌ cwt:—of course time would much improve the flavor and appearance of the bean.

No. 2, is from similar stock as No. 1, but not so well cared for, I think, in growth and process of picking. In quality, size, and complexion, and in being deficient, at present, of smell or fragrance, similar to No. 1; worth, when prepared for market, about 50*s.* ⅌ cwt. I should be glad to learn what the probable cost would be for producing these coffees per maund, in Assam.

Remarks by Lt.-Col. Wm. Sage.—It would be useful, both to the grower who seeks an opinion, and to the Committee who have to give one, if a statement was sent with all musters, showing the locality in which the berry was grown, the quantity of land occupied by the plants, the yield per beegah, and the cost of cultivation, rent of the land, and with carriage to the market. With this data, by adding freight, the price it would probably fetch in the Home market, would enable the Society, and the grower, to judge how far the cultivation of coffee in that locality had a fair prospect of being permanently remunerative. The required data would be useful to the country generally, and it would enable the Society, in the distribution of seeds and plants, to direct its attention to those localities which might afford the best prospects of success.

Correspondence and Selections.

MR. FORTUNE'S REPORT UPON THE TEA PLANTATIONS IN THE NORTH WESTERN PROVINCES.

To the Secretary Calcutta Agricultural and Horticultural Society.

General Department N.W.P. } Sir,—By direction of the Hon'ble the Lieutenant Governor, I have the honor to forward for the acceptance of the Horticultural Society, the accompanying 10 copies of a printed pamphlet on tea plantations, by Mr. Fortune, and to communicate His Honor's desire that it may be allowed to appear in the next No. of the Society's Journal.

I have, &c.,
J. W. SHERER,
Offg. Asst. Secy. to the Govt. of the N. W. P.

SIMLAH: *the 24th October,* 1851.

JOHN THORNTON, ESQ.,
Secy. to the Govt. N. W. Provinces.

Sir,—Having inspected the whole of the Government and Zemindaree Tea plantations in Gurhwal and Kumaon, in compliance with orders of the Honorable the Lieutenant-Governor North Western Provinces, sanctioned by the Most Noble the Governor General of India, I have now the honor to transmit my Report upon the condition of these plantations, and upon the future prospects of Tea Cultivation in the Himalayas. I have also suggested some improvements in the cultivation and manufacture, which I have been able to do from experience gained during a long residence in China, and which I believe to be of great importance.

I have, &c.,

Calcutta: September 6, 1851. ROBT. FORTUNE.

Kaolagir Tea Plantation.

1. *Situation and Extent.*—The Deyra Doon, or Valley of Deyra, is situated in latitude 30° 18′ north, and in longitude 78° east. It is about 60 miles in length from east to west, and 16 miles broad at its widest part. It is bounded on the south by the Sewalick range of hills, and on the north by the Himalayas proper, which are here nearly 8,000 feet above the level of the

sea. On the west it is open to the river Jumna, and on the east to the Ganges, the distance between these rivers being about 60 miles.

In the centre of this flat valley, the Kaolagir tea plantation has been formed. Eight acres were under cultivation in 1847. There are now 300 acres planted, and about 90 more taken in and ready for many thousands of young plants raised lately from seeds in the plantation.

2. *Soil and Culture.*—The soil of this plantation is composed of clay, sand, and vegetable matter, rather stiff, and apt to get "baked" in dry weather, but free enough when it is moist or during the rains. It rests upon a gravelly subsoil, consisting of lime-stone, sand-stone, clay-stone, and quartz rock, or of such rocks as enter into the composition of the surrounding mountain ranges. The surface is comparatively *flat*, although it falls in certain directions towards the ravines and rivers.

The plants are arranged neatly in rows 5 feet apart, and each plant is about 4½ feet from its neighbour in the row. A long rank-growing species of grass indigenous to the Doon, is most difficult to keep from over-topping the tea plants, and is the cause of much extra labor. Besides the labor common to all tea countries in China, such as weeding, and occasionally loosening the soil, there is here an extensive system of irrigation carried on. To facilitate this, the plants are planted in trenches, from four to six inches below the level of the ground, and the soil thus dug out is thrown between the rows to form the paths. Hence the whole of the plantation consists of numerous trenches of this depth, and five feet from centre to centre. At right angles with these trenches a small stream is led from the canal, and by opening or shutting their ends irrigation can be carried on at the pleasure of the Overseer.

3. *Appearance and Health of Plants.*—The plants generally did not appear to me to be in that fresh and vigorous condition which I had been accustomed to see in good Chinese plantations. This, in my opinion, is caused, 1st, by the plantation being formed on *flat land;* 2nd, by the system of *irrigation;* 3rd, by too early plucking; and 4th, by hot drying winds, which are not unfrequent in this valley from April to the beginning of June.

Guddowli Plantation (near Paorie).

1. *Situation and Extent.*—This plantation is situated in the Province of Eastern Gurhwal, in latitude 30° 8′ north, and in longitude 78° 45′ east. It consists of a large tract of terraced land, extending from the bottom of a valley or ravine to more than 1,000 feet up the sides of the mountain. Its lowest portion is about 4,300 feet, and its highest 5,300 feet above the level of the sea; the surrounding mountains appear to be from 7,000 to 8,000 feet. The plantation has not been measured, but there are, apparently, fully one hundred acres under cultivation.

There are about 500,000 plants already planted, besides a large number of seedlings in beds ready for transplanting. About 3,400 of the former were planted in 1844, and are now in full bearing; the greater portion of the others are much younger, having been planted out only one, two, and three years.

2. *Soil and Culture.*—The soil consists of a mixture of loam, sand, and vegetable matter, is of a yellow colour, and is most suitable for the cultivation of the tea plant. It resembles greatly the soil of the best tea districts in China. A considerable quantity of stones are mixed with it, chiefly small pieces of clay-slate, of which the mountains here are composed. Large tracts of equally good land, at present covered with jungle, are available in this district without interfering in any way with the rights of the settlers.

I have stated that this plantation is formed on the hill side. It consists of a succession of terraces, from the bottom to the top, on which the tea bushes are planted. In its general features it is very like a Chinese tea plantation, although one rarely sees tea lands terraced in China. This, however, may be necessary in the Himalayas, where the rains fall so heavily. Here too the system of irrigation is carried on, although to a small extent only, owing to the scarcity of water during the dry season.

3. *Appearance and Health of Plants.*—This plantation is a most promising one, and I have no doubt will be very valuable in a few years. The plants are growing admirably, and evidently like their situation. Some of them are suffering slightly from the effects of hard-plucking, like those at Kaolagir; but this can easily be avoided in their future management. Altogether, it is in a most satisfactory condition, and shews how safe it is in matters of this kind to follow the example of the Chinese cultivator, who never makes his tea plantations on *low rice land* and *never irrigates.*

Hawulbaugh Plantation, (near Almorah).

1*st. Situation and Extent.*—This tea farm is situated on the banks of the river Kossilla, about 6 miles north-west from Almorah, the capital of Kumaon. It is about 4,500 feet above the level of the sea. The land is of an undulating character, consisting of gentle slopes and terraces, and reminded me of some of the best tea districts in China. Indeed, the hills themselves, in this part of the Hymalayas, are very much like those of China, being barren near their summit, and fertile on their lower sides.

Thirty-four acres of land are under tea cultivation here, including the adjoining farm of Chullar. Some of the plants appear to have been planted in 1844; but, as at Paorie, the greater number are only from one to three years old.

2*nd. Soil and Culture.*—The soil is what is usually called a sandy-loam; it is moderately rich, being well mixed with vegetable matter. It is well suited for tea cultivation. The greater part of the farm is terraced as at Guddowli, but some few patches are left in natural slopes, in accordance with the Chinese method. Irrigation is practised to a limited extent.

3rd. Appearance and Health of Plants.—All the young plants here are in robust health, and are growing well, particularly where they are growing on land where water cannot flood or injure them. As examples of this, I may point out a long belt between Dr. Jameson's house and the flower garden, and also a piece of ground a little below the houses in which the Chinese manufacturers live. Some few of the older bushes appear rather stunted; but this is evidently the result of water remaining stagnant about their roots, and partly also of over-plucking; both defects, however, admit of being easily cured.

Lutchmisser and Kuppeena Plantations.

1st. Situation and Extent.—These plantations are on the hill-side near Almorah, and about 5,000 feet above the level of the sea. The situation is somewhat steep, but well adapted to the growth of tea. The former contains three acres, and the latter four acres under cultivation.

2nd. Soil and Culture.—The soil is light and sandy, and much mixed with particles of clay-slate, which have crumbled down from the adjoining rocks. I believe these plantations are rarely irrigated, and the land is steep enough to prevent any stagnant water from remaining about the roots of the plants.

3rd. Appearance and Health of Plants.—Most of the bushes here are fully grown, and in full bearing, and generally in good health. On the whole, I consider these plantations in excellent order.

Bheemtal Plantations.

The lake of Bheemtal is situated in latitude 29° 30′ north, and in longitude 79° 30′ east. It is 4,000 feet above the level of the sea, and some of the surrounding mountains are said to be 8,000 feet. These form the southern chain of the Himalayas, and bound the vast plain of India, of which a glimpse can be had through the mountain passes. Amongst these hills there are several *tals* or lakes, some flat meadow-looking land, and gentle undulating slopes, while higher up we have steep and rugged mountains. It is amongst these hills, that the Bheemtal tea plantations have been formed. They may be classed under three heads, viz.:—

1st. Anoo and Kooasur Plantations.—These adjoin each other, are both formed *on low flat land*, and together cover about 46 acres. The plants do not seem healthy or vigorous; many of them have died out, and few are in that state which tea plants ought to be in. Such situations never ought to be chosen for tea cultivation. The same objection applies to these as to those at Deyra, but in a greater degree. No doubt, with sufficient drainage, and great care in cultivation, the tea plant might be made to exist in such a situation; but I am convinced it would never grow with that luxuriance which is necessary in order to render it a profitable crop. *Besides, such lands are valuable for other purposes.* They are excellent rice lands, and as such of considerable value to the natives.

2nd. Bhurtpoor Plantations.—This plantation covers about 4½ acres of terraced land on the hill side, a little to the eastward of those last noticed. The soil is composed of a light loam, much mixed with small pieces of clay-slate and trap or green-stone, of which the adjacent rocks are composed. It contains also a small portion of vegetable matter or *humus*. Both the situation and soil of this plantation are well adapted to the requirements of the tea shrub, and consequently we find it succeeding here as well as at Gud-dowli, Hawulbaugh, Almorah, and other places where it is planted on the slopes of the hills.

3rd. Russia Plantation.—This plantation extends over 75 acres, and is formed on sloping land. The elevation is somewhat less than Bhurtpoor, and although terraced in the same way, the angle is much lower. In some parts of the farm the plants are doing well, but generally they seemed to be suffering from too much water and hard plucking. I have no doubt, however, of the success of this farm, when the system of cultivation is improved. I observed some most vigorous and healthy bushes in the Overseer's garden, a spot adjoining the plantation, which could not be irrigated, and was informed they "never received any water, except that which fell from the skies."

In the Bheemtal district, there are large tracts of excellent tea land. In crossing the hills towards Nainee Tal, with J. H. Batten, Esq., Commissioner of Kumaon, I pointed out many tracts admirably adapted for tea cultivation, and of no great value to the natives; generally those lands on which the mundooa is cultivated, are the most suitable.

I have thus described all the Government plantations in Gurhwal and Kumaon. Dr. Jameson, the Superintendent, deserves the highest praise for the energy and perseverance with which he has conducted his operations. I shall now notice the plantations of the zemindars, under the superintendence of the Commissioner and Assistant Commissioner of Kumaon and Gurhwal.

Zemindaree Tea Plantations.

1st, at Lohba.—This place is situated in eastern Gurhwal, about 50 miles to the westward of Almorah, and is at an elevation of 5,000 feet above the level of the sea. It is one of the most beautiful spots in this part of the Himalayas. The surrounding mountains are high, and in some parts precipitous, while in others they are found consisting of gentle slopes and undulations. On these undulating slopes, there is a great deal of excellent land suitable for tea cultivation. A few tea bushes have been growing vigorously for some years in the Commissioner's garden, and they are now fully ten feet in height. These plants having succeeded so well, naturally induced the authorities of the province to try this cultivation upon a more extensive scale. It appears that in 1844, about 4,000 young plants were obtained from the Government plantations, and planted on a tract of excellent land, which the natives wished to abandon. Instead of allowing the people to throw up their land, they were promised it rent-free, upon the condition that they attended to the cultivation of the tea, which had been planted on a small portion of the ground attached to the village.

This arrangement seems to have failed, either from want of knowledge, or from design, or perhaps partly from both of these causes. More lately, a larger number of plants have been planted, but I regret to say with nearly the same results.

But results of this discouraging kind are what any one, acquainted with the nature of the tea plant, could have easily foretold, had the treatment, intended to be given it, been explained to him. Upon enquiry, I found the villagers had been managing the tea lands just as they had been doing their rice fields ; that is, a regular system of irrigation was practised. *As water was plentiful,* a great number, indeed nearly all, of the plants seem to have perished from this cause. The last planting alluded to had been done late in the spring, and just at the commencement of the dry weather, and to these plants little or no water seems to have been given. So that in fact it was going from one extreme to another equally bad, and the result was of course nearly the same.

I have no hesitation in saying that the district in question is well adapted for the cultivation of tea. With judicious management, a most productive farm might be established here in four or five years. Land is plentiful, and of little value either to the natives or to the Government.

2nd, at Kutoor.—This is the name of a large district 30 or 40 miles northward from Almorah, in the centre of which the old town or village of Byznath stands. It is a fine undulating country consisting of wide valleys, gentle slopes, and little hills, while the whole is intersected by numerous streams, and surrounded by high mountains. The soil of this extensive district is most fertile, and is capable of producing large crops of rice on the low irrigable lands, and the dry grains and tea on the sides of the hills. From some cause however, either the thinness of population, or *the want of a remunerative crop,*[*] large tracts of this fertile district have been allowed to go out of cultivation. Every where I observed ruinous and jungle-covered terraces, which told of the more extended cultivation of former years.

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[*] The crops of this district, such as rice, mundooa, and other grains, are so plentiful and cheap as scarcely to pay the carriage to the nearest market town, much less to the plains. In Almorah, a maund of rice or mundooa sells for something less than a rupee, barley for eight annas, and wheat for a rupee.

Amongst some hills near the upper portion of this district, two small tea plantations have been formed under the patronage and superintendence of Captain Ramsay, Senior Assistant Commissioner of Kumaon. Each of them cover three or four acres of land, and had been planted about a year before the time of my visit. In this short space of time, the plants had grown into nice strong bushes, and were in the highest state of health. I never saw, even in the most favoured districts in China, any plantations looking better than these. This result, Captain Ramsay informed me, had been attained in the following simple manner. All the land attached to the two villages with which the tea farms are connected, is exempted from the revenue tax, a sum amounting only to Rs. 52 per annum. In lieu of this, the assamees (cultivators) of both villages assist with manure, and at the transplanting season, as well as ploughing and preparing fresh land. In addition to this, one chowdree and four prisoners are constantly employed upon the plantations. The chief reason of the success of these plantations, next to that of the land being well suited for tea cultivation, may, no doubt, be traced to a good system of management: that is, the young plants have been carefully transplanted at the proper season of the year, when the air was charged with moisture, and they have not been destroyed by excessive irrigation afterwards. The other zemindaree plantation at Lohba might have been now in full bearing had the same system been followed.

From the description thus given, it will be observed that I consider the Kutoor plantations in a most flourishing condition. And I have no doubt they will continue to flourish, and soon convince the zemindars of the value of tea cultivation, provided three things intimately connected with the success of the crop are strongly impressed upon their minds; viz., the unsuitableness of low wet lands for tea cultivation; the folly of irrigating tea as they would do rice; and the impropriety of commencing the plucking before the plants are strong and of considerable size. It is difficult in a Report to give an idea of proper time to begin plucking, but I have explained my views upon the subject fully to Dr. Jameson and to Captain Ramsay. I am happy to add that amongst these hills there are no foolish prejudices in the minds of the natives against the cultivation of tea. About the time of my visit, a zemindar came and begged two thousand plants, to enable him to commence tea growing on his own account.

It is of great importance, that the authorities of a district and persons of influence, should shew an interest in a subject of this kind. At present the natives do not know its value, but they are as docile as children, and will enter willingly upon tea cultivation, provided the "sahib" shews that he is interested in it. In a few years the profits received will be a sufficient inducement.

In concluding this part of my Report, I beg to suggest the propriety of obtaining some of the *best varieties* of the tea plant which have been introduced lately into the Government plantations from China. Dr. Jameson could no doubt spare a few, but they ought to be given to those zemindars only who have succeeded with the original variety.

Having described in detail the various Government plantations, and also those of the zemindars which came under my notice in the Himalayas, I shall now make some general remarks upon the cultivation of tea in India, and offer some suggestions for its improvement.

General Remarks.

1. *On Land and Cultivation.*—From the observations already made upon the various tea farms which I have visited in the Himalayas, it will be seen that I do not approve of *low flat lands* being selected for the cultivation of the tea shrub. In China, which at present must be regarded as the model tea country, the plantations are never made in such situations, or they are so rare as not to have come under my notice. In that country they are usually formed on the lower slopes of the hills, that is, in such situations as those at Guddowli, Hawulbaugh, Almorah, Kutoor, &c., in the Himalayas. It is true that in the fine green tea country of Hwuychow, in China, near the town of Tunche, many hundred acres of flattish land are under tea cultivation. But this land is close to the hills, which jut out into it in all directions, and it is intersected by a river whose banks are usually from 15 to 20 feet above the level of the stream itself, not unlike those of the Ganges below Benares. In fact, it has all the advantages of hilly land such as the tea plant delights in. In extending the Himalaya plantation this important fact ought to be kept in view.

There is no scarcity of such land in those mountains, more particularly in Eastern Gurhwal and Kumaon. It abounds in the districts of Paorie, Kunour, Lohba, Almorah, Kutoor, and Bheemtal, and I was informed by Mr Batten that there are large tracts about Gungoli and various other places equally suitable. Much of this land is out of cultivation, as I have already stated, while the cultivated portions yield on an average only two or three annas per acre of revenue.

Such lands are of less value to the zemindars than low rice land, where they can command a good supply of water for irrigation. But I must not be understood to recommend poor worn out hill lands for tea cultivation,—land on which nothing else will grow. Nothing is further from my meaning. Tea, in order to be profitable, requires a good sound soil,—a light loam, well mixed with sand and vegetable matter, moderately moist, and yet not stagnant or sour. Such a soil, for example, as on these hill sides produces good crops of mundooa, wheat, or millet, is well adapted for tea. It is such lands which I have alluded to as abounding in the Himalayas, and which are, at present, of so little value either to the Government, or to the natives themselves.

The system of irrigation applied to tea in India is never practised in China. I did not observe it practised in any of the great tea countries which I visited. On asking the Chinese manufacturers whom I brought round, and who had been born and brought up in these districts, whether they had seen such a practice, they all replied, "*no, that is the way we grow rice; we never irrigate tea.*" Indeed, I have no hesitation in saying that, in nine cases out of ten, the effects of irrigation are most injurious. When tea will not grow without irrigation, it is a sure sign that the land employed is not suitable for such a crop. It is no doubt an excellent thing to have a command of water in case of a long drought, when its agency might be useful in saving a crop which would otherwise fail, but irrigation ought to be used only in such emergent cases.

I have already observed that good tea land is naturally moist, although not stagnant; and we must bear in mind that the tea shrub is *not a water plant*, but is found in a wild state on the sides of hills. In confirmation of these views, it is only necessary to observe further, that all the *best Himalayan plantations are those to which irrigation has been most sparingly applied.*

In cultivating the tea shrub much injury is often done to a plantation by *plucking leaves from very young plants.* In China young plants are never touched until the third or fourth year after they have been planted. If growing under favorable circumstances, they will yield a good crop after that time. All that ought to be done, in the way of plucking or pruning before that time, should be done with a view to *form the plants*, and make them *bushy* if they do not grow so naturally. If plucking is commenced too early and continued, the energies of the plants are weakened, they are long in attaining any size; and consequently there is a great loss of produce in a given number of years. To make this more plain, I will suppose a bush that has been properly treated to be eight years of age. It may then be yielding from two to three pounds of tea per annum, while another of the same age, but not a quarter of the size, from over-plucking, is not giving more than as many ounces.

The same remarks apply also to plants which become unhealthy from any cause; leaves ought never to be taken from such plants; the gatherers should have strict orders to pass them over until they get again into a *good state* of health.

2nd. On Climate. I have already stated that eastern Gurhwal and Kumaon appear to me to be the most suitable for the cultivation of the tea plant in this part of the Himalayas. My remarks upon climate will therefore refer to this part of the country.

From a table of temperature kept at Hawulbaugh from November 28th, 1850, to July 13th, 1851, obligingly furnished me by Dr. Jameson, I observe that the climate here is extremely mild. During the winter months, the thermometer (Fahr.) at sunrise never lower than 44°, and only on two occasions so low, namely on the 15th and 16th of February 1851. Once it stood so high as 66° on the morning of February the 4th, but this is full ten degrees higher than usual. The minimum in February must, however, be several degrees lower than is shewn by this table, for ice and snow are not unfrequent; indeed, opposite the 16th of February in the column of remarks, I find written down *a very frosty morning.* This discrepancy no doubt arises either from a bad thermometer being used, or from its being placed in a sheltered verandah. We may, therefore, safely mark the minimum as 32° instead of 44°.

The month of June appears to be the hottest in the year. I observe the thermometer on the 5th, 6th, and 7th of that month stood at 62° at 3 P. M., and this was the highest degree marked during the year. The lowest, at this hour, during the month was 76°, but the general range in the 3 P. M. column of the table is from 80? to 90°.

The wet and dry seasons are not so decided in the hills as they are in the plains. In January 1851, it rained on five days and ten nights, and the total quantity of rain which fell, as indicated by the rain-guage, during this month was 5.25 inches; in February 3.84 fell; in March 2.11; in April 2.24; in May none; and in June 6.13. In June there are generally some days of heavy rain, called by the natives Chota Bursaut or small rains, after this there is an interval of some days of dry weather before the regular "rainy season" commences. This season comes on in July and continues until September. October and November are said to be beautiful months with a clear atmosphere and cloudless sky. After this fogs are frequent in all the valleys until spring.

In comparing the climate of these provinces with that of China, although we find some important difference, yet upon the whole there is a great similarity. My comparisons apply, of course, to the best tea districts only, for although the tea shrub is found cultivated from Canton in the south to Tan-chow-poo in Shan-tung, yet the provinces of Fokein, Kiansee and the southern parts of Kiangnan yield nearly all the finest teas of commerce.

The town of Tsong-gan, one of the great black tea towns near the far-famed Woo-e-shan, is situated in latitude 27° 47′ north. Here the thermometer in the hottest months, namely in July and August, rarely rises above 100° and ranges from 92° to 100° as maximum; while in the coldest months, December and January, it sinks to the freezing point, and sometimes a few degrees lower. We have thus a close resemblance in temperature between Woo-e-shan and Almorah. The great green tea district being situated two degrees further north, the extremes of temperature are somewhat greater. It will be observed, however, that while the hottest month in the Himalayas is June, in China the highest temperature occurs in July and August: this is owing to the rainy season taking place earlier in China than it does in India.

In China rain falls in heavy and copious showers in the end of April, and these rains continue at intervals in May and June. The first gathering of tea-leaves, those from which the Pekoe is made, is scarcely over before the air becomes charged with moisture, rain falls, and the bushes being thus placed in such favorable circumstances for vegetating are soon covered again with young leaves, from which the main crop of the season is obtained.

No one, acquainted with vegetable physiology, can doubt the advantages of such weather in the cultivation of tea for mercantile purposes. And these advantages, to a certain extent at least, seem to be extended to the Himalayas, although the regular rainy season is later than in China. I have already shewn from Dr. Jameson's table, that spring showers are frequent in Kumaon, although rare in the plains of India; still, however, I think it would be prudent to adapt the gathering of leaves to the climate, that is, to take a moderate portion from the bushes before the rains, and the main crop after they have commenced.

3rd. *On the Vegetation of China and the Himalayas.* One of the surest guides from which to draw conclusions, on a subject of this nature, is found in the indigenous vegetable productions of the countries. Dr. Royle, who was the first to recommend the cultivation of tea in the Himalayas, drew his conclusions, in the absence of that positive information from China which we possess now, not only from the great similarity in temperature between China and these hills, but also from the resemblance in vegetable productions. This resemblance is certainly very striking. In both countries, except in the low valleys of the Himalayas (and these we are not considering) tropical forms are rarely met with. If we take trees and shrubs, for example, we find such genera as pinus, cypress, berberis, quercus, viburnum, indigofera, andromeda, lonicera, deutzia, rubus, myrica, spiræa, ilex, and many others common to both countries.

Amongst herbaceous plants we have gentiana, aquilegia, anemone, rumex, primula, lilium, leontodon, ranunculus, &c., equally distributed in the Himalayas, and in China, and even in aquatics the same resemblance may be traced, as in nelumbium, caladium, &c. And further than this, we do not find plants belonging to the same genera only, but in many instances the identical species are found in both countries. The indigofera, common in the Himalayas, abounds also on the tea hills of China, and so does berberis nepaulensis, lonicera diversifolia, myrica sapida,[*] and many others.

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[*] The Chinese have a fine variety of this fruit which ought by all means to be introduced to the Himalayas. It is as large as an Orleans plum, and as superior to the Indian one as the apple is to the crab. It would be a great luxury to the poor. GRAFTED PLANTS must be procured.

The variety of the Bamboo, common about temples on the tea hills of China, would also be of much value in India, where there is nothing to be compared to them.

Were it necessary, I might now shew that there is a most striking resemblance between the geology of the two countries as well as in their vegetable productions. In both the black and green tea countries which I have alluded to, clay-slate is most abundant. But enough has been advanced to prove how well many parts of the Himalayas are adapted for the cultivation of tea; besides, the flourishing condition of many of the plantations is, after all, the best proof, and puts the matter beyond all doubt.

4th. *Concluding Suggestions.*—Having shewn that tea can be grown in the Himalayas, and that it would produce a valuable and remunerative crop, the next great object appears to be the production of superior tea, by means of fine varieties and improved cultivation. It was well known that a variety of the tea plant existed in the southern parts of China, from which inferior teas only were made. That, being more easily procured than the fine northern varieties, from which the great mass of the best teas are made, was the variety originally sent to India. From it all those in the Government plantations have sprung.

It was to remedy this, and to obtain the best varieties from those districts which furnish the trees of commerce, that induced the Honorable Court of Directors to send me to China in 1848. Another object was to obtain some good manufacturers and implements from the same districts. As the result of this Mission, nearly twenty thousand plants from the best black and green tea countries of Central China have been introduced to the Himalayas. Six first-rate manufacturers, two lead-men, and a large supply of implements from the celebrated Hwuychow districts were also brought round and safely located on the Government plantations in the hills.

A great step has thus been gained towards the objects in view. Much, however, remains still to be done. The new China plants ought to be carefully propagated and distributed over all the plantations; some of them ought also to be given to the zemindars, and more of these fine varieties might be yearly imported from China.

The Chinese manufacturers, who were obtained some years since from Calcutta or Assam, are, in my opinion, far from being first-rate workmen; indeed, I doubt much if any of them learned their trade in China. They ought to be gradually got rid of, and their places supplied by better men, for it is a great pity to teach the natives an inferior method of manipulation. The men brought round by me are first-rate green tea makers, they can also make black tea, but they have not been in the habit of making so much black as green. They have none of the Canton illiberality or prejudices about them, and are most willing to teach their art to the natives. I have no doubt some of the latter will soon be made excellent tea manufacturers. And the instruction of the natives is, no doubt, one of the chief objects which ought to be kept in view, for the importation of Chinese manipulators at high wages can only be regarded as a temporary measure; ultimately th

Himalayan tea must be made by the natives themselves; each native farmer must learn how to make tea as well as how to grow it; he will then make it upon his own premises, as the Chinese do, and the expences of carriage will be much less than if the green leaves had to be taken to the market.

But as the zemindars will be able to grow tea long before they are able to make it, it would be prudent in the first instance to offer them a certain sum for green leaves brought to the Government manufactory.

I have pointed out the land most suitable for the cultivation of tea, and shewn that such land exists in the Himalayas to an almost unlimited extent. But if the object the Government have in view be the establishment of a company to develope the resources of these hills as in Assam, I would strongly urge the propriety of concentrating, as much as possible, the various plantations. Sites ought to be chosen which are not too far apart, easy of access, and, if possible, near rivers; for, no doubt, a considerable portion of the produce would have to be conveyed to the plains or to a sea-port.

In my tour amongst the hills, I have seen no place so well adapted for a central situation as Almorah or Hawulbagh. Here the Government has already a large establishment, and tea lands are abundant in all directions. The climate is healthy, and better suited to a European constitution than most other parts of India. Here plants from nearly all the temperate parts of the world are growing as if they were at home. As examples, I may mention myrtles, pomegranates, and tuberoses from the south of Europe; dahlias, potatoes, aloes, and yuccas from America; melianthus major and bulbs from the Cape; the cypress and deodar of the Himalayas; and the lagerstræmias, loquats, roses, and tea of China.

In these days, when tea has become almost a necessary of life to England and her wide-spreading Colonies, its production upon a large and cheap scale is an object of no ordinary importance. But to the natives of India themselves, the production of this article would be of the greatest value. The poor *paharie*, or hill farmer, at present, has scarcely the common necessaries of life, and certainly none of its luxuries. The common sorts of grain which his lands produce will scarcely pay the carriage to the nearest market-town, far less yield a profit of such a kind as will enable him to purchase some few of the necessary and simple luxuries of life. A common blanket has to serve him for his covering by day, and for his bed at night, while his dwelling-house is a mere mud-hut, capable of affording but little shelter from the inclemency of the weather. Were part of these lands producing tea, he would then have a healthy beverage to drink, besides a commodity which would be of great value in the market. Being of small bulk compared with its value, the expense of carriage would be trifling, and he would return home with the means in his pocket of making himself and his family more comfortable and more happy.

Were such results doubtful, we have only to look across the frontiers of India into China. Here we find tea one of the necessaries of life in the strictest sense of the word. A Chinese never drinks cold water, which he abhors, and considers unhealthy. Tea is his favourite beverage from morning until night; not what we call tea, mixed with milk and sugar, but the essence of the herb itself drawn out in pure water. One acquainted with the habits of this people can scarcely conceive the idea of the Chinese Empire existing were it deprived of the tea plant; and I am sure that the extensive use of this beverage adds much to the health and comfort of the great body of the people.

The people of India are not unlike the Chinese in many of their habits. The poor of both countries eat sparingly of animal food, and rice with other grains and vegetables form the staple articles on which they live; this being the case, it is not at all unlikely the Indian will soon acquire a habit which is so universal in the sister country. But in order to enable him to drink tea, it must be produced at a cheap rate; he cannot afford to pay at the rate of four or six shillings a pound. It must be furnished to him at four *pence* or six *pence* instead, and this can be done easily, but only on his own hills. If this is accomplished, and I see no reason why it should not be, a boon will have been conferred upon the people of India, of no common kind, and one which an enlightened and liberal Government may well be proud of conferring on its subjects.

ROBERT FORTUNE.

No. 12.—*Sketch of the Climate and Vegetation of the Himalaya. By* THOMAS THOMSON, M.D., *Assistant-Surgeon in the H.E.I.C. Service, Bengal Establishment.*

The great range of the Himalaya, when taken in conjunction with the still more elevated mountains behind, which are in nowise distinguishable from it, constitutes the most stupendous mass of mountains in the world, not only from containing the highest peaks, but also, and still more remarkably, as presenting by far the greatest area of elevated land.

This gigantic mountain mass lies to the north of the great plain of India, from which it rises on the whole very abruptly. It has a direction very nearly from east to west, its west extremity is however little more northerly than the east, the latitude rising from 26° at the east, to 33° at the west extremity.

The mountain chain to which the name of Himalaya is most properly applied, may be considered as bounded at the south by the plains of India, and on the north by the rivers Indus and Burrampooter, which have their sources in the same spot, and run one to the east, the other to the west, among lofty mountains, till they enter the Indian flat country. Nearly in the centre of this chain, in the most westerly part of Nepal proper, lies the point of separation between the two great river systems, that of the Indus and that of the Burrampooter, constituting a north and south axis, which, when better known, will probably prove to be the grand axis of Asia.

From this centre the chain of the Himalaya extends to nearly an equal distance in both directions, the central axis of the chain being the line of water-shed between the streams which run toward the plains of India on the south, and those which flow toward the Burrampooter and Indus on the north. This line of water-shed or central axis will, on inspection of a map, be seen to be in general somewhat to the north of half way between the two boundary lines of the chain, so that the distance from the axis to the plains of India is greater than from the same place to the northern rivers. The mean width of the whole chain may be stated roughly to average about 150 miles, of which 90 are to the south of the line of water-shed, and 60 to the north of it.

From the central axis of the chain lateral ranges of mountains run both to the north and to the south, stretching in the latter direction as far as the plains of India, and separated from one another by deep narrow valleys, which extend far into the interior of the mass of mountains.

The number of lateral chains of the first class, which form the line of division or water-shed between the basins of the great rivers on the south side of the central axis of the Himalaya, is about fourteen, separating from one another in a series from left to right the waters of the Jhelum, the Chenab, the Beas, the Ravi, the Sutlej, the Jumna, the Ganges, the Gogra, the Gandak, the Kosi, the Teesta, and the Subhansheri. These great chains, like the central axis, throw off lateral branches, which separate from one another the different branches, by the union of which within the mountains the great rivers are formed.

The elevation of the central axis of the Himalaya is probably at a mean about 18,000 or 20,000 feet; it is nearly uniform at about these elevations throughout a great part of the chain, but gradually diminishes toward both ends. Like all mountain chains, it presents alternations of high and low portions; the lower parts, or passes as they are called, from their affording the means of passage to travellers from one side to the other, being at the upper extremities of the river basins. These passes are, with a few exceptions, rarely under 17,000 or 18,000 feet. The lateral chains, starting from the more elevated portions of the central axis between the passes, gradually diminish in elevation as they approach the plains of India, not however with any exact uniformity of the progression, for it is not unfrequent to find them rise into lofty peaks considerably more elevated than any known part of the central axis. The greater part of the giant peaks, which rise to an elevation of 26,000 or 28,000 feet, are situated in this manner, not on the central axis, but to the south of it; it is however by no means improbable that masses of equal elevation, not yet measured or observed, may occur behind them; *it being unquestionable that the general elevation of the country continues to increase as we advance to the north, and that we have not yet* (except in one place) attained to any point from which a descent is commenced towards the northern plains.

The direction of the principal lateral chains, and of their included valleys, is on the whole perpendicular to the main axis, but with an inclination from the centre; those on the extreme east inclining to the eastward, while those on the extreme west have a very westerly direction. There are certain anomalies in the courses of the rivers, particularly at the north-west extremity of the chain; which, however, may be overlooked in a view so general and cursory of these rivers as must necessarily be taken on the present occasion. The most marked of these peculiarities may be observed in the course of the Sutlej, which runs for a very considerable part of its course nearly parallel to the Indus before it turns toward the plains, thus separating the western part of the Himalayan chain almost from its very origin into two branches, one of which separates the Sutlej from the Indus; the other to the south of, and nearly parallel to, the other, divides the basin of the Sutlej from that of the Jumna and Ganges.

From the great depth of the valleys which separate the different mountain chains, it but seldom happens that any road crosses from one valley to another, a traveller has therefore, in general, excellent opportunities of studying the direction and ramifications of the different chains, either in following the course of the valleys, or by travelling along the top of the ridges. In both cases he will find that his course is an undulating one, each chain and each branch of a chain being a curve, which bends first to one side, and afterwards to the other, giving off generally a spur on the convex side, while the head of a valley insinuates itself into the concavity.

After these few words on the physical structure of the mountains, the vegetation of which it is my wish briefly to describe, it will still be necessary to devote a few minutes to the subject of climate and humidity, before I can proceed to my proper subject.

Situated in the most southern part of the temperate zone, and bounding on the north a great peninsula, which extends far into the torrid zone, the base of the Himalaya to the south possesses an almost tropical climate, tempered however, when the sun is on the tropic of Capricorn, by a moderately cool winter, and variously modified in different parts of the chain by the degree of humidity, a most important matter to be taken into consideration in every question connected with the phenomena of vegetable life.

The source of humidity in the Himalaya is almost entirely the Bay of Bengal, which is situated about 5° to the south of the eastern extremity of the chain; and the wind which carries the humid atmosphere along the chain, is that which is known to nautical meteorologists as the south-west monsoon, a wind which begins to blow in the open sea about the month of April, but whose effects are not felt in the far interior before the month of June. This wind, though constant in its direction at sea, is not so in its inland course; at the head of the Bay of Bengal it is almost a south wind. It blows from the sea nearly due north towards the Himalaya, striking in its course upon the low chain of the Khasya hills, whose maximum elevation is scarcely 7000 feet.

Upon this range the first force of the monsoon is expended, and the annual fall of rain at Churra Poonjee, elevated 4000 feet on its southern slope, amounts to about 500 inches. This range, which has its origin among the mountain ranges of the south of China and north of Burmah, lies to the south of the Burrampooter, and, following the course of that river, terminates in the concavity of its great bend, where it turns down toward the sea. The Khasya mountains do not therefore entirely run across the Bay of Bengal, so as to intercept the force of the monsoon from the whole of the Himalaya, a part of which wind, laden to saturation with moisture at a temperature of nearly 90° F., blows due north from the Bay of Bengal upon the district of Sikkim, which is on that account the most rainy part of the range of the Himalaya, for, on the one hand, the more eastern parts of the chain are protected by the Khasya range, and on the other, the more westerly parts are more distant from the source of moisture, and therefore receive a less share of it. The interception of the moisture from the province of Bootan and the independent states north of Assam, by the Khasya range, has this curious effect, that the lower ranges of this portion of the Himalaya are dry and arid, while above 7000 feet, to which elevation only the hills to the south attain, the climate is very much more humid.

The diminution in the amount of moisture in proceeding to the westward along the Himalaya from Sikkim, is extremely gradual, but also, so far as our present rather limited number of observations go, very regular. The effects of the south-west or rainy monsoon diminish step by step, as we advance westward, till on arriving at the valley of the Indus at the western extremity of the Himalaya, it ceases to be observed at all. In these most western portions of the chain, very little rain falls at any season of the year, and the little which does occur falls in the spring months, and is therefore quite independent of the regular monsoon.

It is also worthy of note, that in the more western parts of the chain the climate is extremely dry at all periods of the year, except during the monsoon or rainy season, as it is called in India, while to the eastward the climate of the mountains shares to a considerable extent the more equable and always moist climate of Bengal.

The most important point of all, however, regarding the climate in respect of its effects on vegetation, which requires to be borne in mind, is that a very great portion of the rain which falls is deposited on the first range of mountains upon which the rain wind strikes. I have already pointed out that this is the case with the Khasya range, and it is there highly strikingly illustrated by the fact, that it is only on the very south side of the hills that the rain-fall is so enormous, the fall twenty miles north of Churra being probably less than half what it is there.

This tendency of the rain-fall to exhaust itself very considerably on the first range of mountains to which it has access, is peculiarly important in a mountain chain 150 miles in width, its effect being that the upper part of all the large valleys, and especially the interior valleys and their ramifications, are much more dry than those adjacent to the plains of India. Even in the most humid part of the Himalaya, in Sikkim, this difference is extremely marked, and in the more dry parts to the west, (the extreme east interior is not known,) the inner valleys are so dry that rain is scarcely ever known to fall.

In close connection with the increase of aridity, as we advance from the plains of India to the interior of the mountains, I may mention the increased elevation of the line of perpetual congelation, which has evidently the same cause. In the outer lofty ranges of the Himalaya, the snow line is met with at about 16,000 feet, while in the Tibetan part of the chain many ridges of 20,000 feet of elevation are almost entirely bare of snow.

Having thus alluded in very brief and general terms to the most prominent physical features of the mountain chain of the Himalaya, I shall proceed to describe, as rapidly as is consistent with clearness, the general character of the vegetation which is to be observed in its different parts at all elevations, from the plains of India to the uppermost limit of vegetable life. This would be an easy task if the vegetation were uniform throughout the whole chain, but owing to the great variations of climate to which I have just adverted, there is very great difference in this respect, few indeed of the plants of the eastern extremity of the Himalaya being identical with those which occur in the far west. In general terms, it may be said, that to the eastward the vegetation is very much more luxuriant and tropical, and that it changes very gradually in advancing to the westward, in exact proportion to the diminution in the quantity of rain. The same gradual transition in the vegetable world may also be observed in advancing up the valleys, or in passing across the mountains from the outer valleys to those which are further removed from the Indian plain; though in the latter case, of course, the effects of gradually increasing elevation must be taken into consideration, as partly the cause of the change, as well as the decrease of humidity.

The plains of northern India which skirt the base of the Himalaya do not (if we except the belt immediately at the base of the mountains) present by any means a rich flora. From their situation nearly on the tropics, their distance as a whole from the sea, and their proximity to the mountains, they are not very damp, and their climate has too decided a lowering of temperature in the cold season to permit them to be clothed with the dense forest vegetation which clothes the tropical plains of South America. They are in general open plains without much wood, and where not under cultivation, are covered either with a dense jungle of different species of Arundo and Saccharum, or with scattered trees of various tropical families, Acaciæ and Zizyphi being very common genera. Here and there only there are patches of forest, generally low and scrubby, and without much underwood, or any of the fine parasitical plants and ferns which are so ornamental in tropical woods.

In the lower parts of Bengal, the proximity of the sea somewhat modifies this general character; a number of ferns, one or two species of pothos, and a few Orchideæ, among which Vanda Roxburghii and a large and fine Cymbidium are the most common, are to be found. In the same way the valleys of Silhet and Assam are exceptional in character, but from their being inclosed with mountains of some elevation on all sides, they are scarcely to be regarded as part of the Indian plain, but may more properly be considered as wide mountain valleys, and they in fact closely resemble in vegetation the valleys of the larger Himalayan rivers in the east part of the chain.

Close to the foot of the chain of mountains thoughout its whole course, from east to west, there lies a belt of forest and swampy land, which is well known in India by the name of Terai, and which, where it is developed to any considerable extent, bears a very bad character for unhealthiness, and is indeed in many places quite impassable for Europeans at most seasons of the year. This forest belt seems to be due to the greater humidity of atmosphere, and at the same time greater equability of temperature, which is produced by the proximity of the mountains. Its width is very various, from forty or fifty miles, to which I believe it attains in some parts of Nepal, to eight or ten miles, which is a more common width. Westward of the Jumna it almost disappears, being represented by a line of swampy or marshy ground, and a low jungle of bushes of the common plain species of trees.

In this belt, which occupies the base of the mountains, the vegetation is of course quite tropical in character, and is too varied to be described in detail. Large cotton trees (Bombax) are in all parts of it particularly conspicuous from the immense size of their trunks, which are not cylindrical, but buttressed all round by immense plates, which project far forward from the main trunk. Numerous fig trees of very various species are also common, especially to the eastward, where many fine forms of these magnificent trees everywhere meet the eye, along with species of Dillenia, Careya, Bauhinia, and Lagerströmia.

It is from the forest which lies along the foot of the Himalaya that a great part of the timber is derived which is consumed in northern India. In the most eastern part, the most valuable timber is furnished by Lagerströmia reginæ, and perhaps other allied species; further west, the *sâl*, Patica robusta, the Shorea robusta of Roxburgh, is that which is most esteemed. The sâl extends from the valley of Assam as far west, I believe, as the Punjab, and is found not only in the forest tract, but also in hot valleys among the mountains. It belongs to a natural order (Dipterocarpeæ) which is peculiary Indian, and which furnishes many valuable kinds of timber. None of the species, however, except the one under consideration, extend beyond the tropics; but they abound in the hilly countries of the peninsula as well as in the low ranges of the Malayan peninsula, and I believe in Java and other India islands. The sâl is so much valued that it has become in accessible places, from whence it can easily be conveyed to the plains, very scarce, and in the vicinity of large towns, where there is a great demand for timber, I believe almost extinct; it is therefore less commonly employed than the sissoo, a species of Dalbergia, which is particularly abundant along the foot of the mountains, more especially to the westward, growing in great profusion on gravelly soil, and yielding a most ornamental and valuable wood.

The forest belt which skirts the base of the mountains rests for the most part upon a dry gravelly soil, which slopes somewhat rapidly, though not perceptibly to the eye, toward the open plains, and is generally dry. Just outside the forest, or sometimes still interspersed with patches of wooded ground, there is generally a low swampy tract, which is lower than the country immediately beyond, and from which the water drains away slowly and with difficulty. This is the Terai *par excellence*, and is, from the constant dampness of the soil, and the dense heat of the summer, peculiarly unhealthy. It is too low and too unhealthy to be much cultivated, and is generally covered by a dense jungle of tall grasses, species principally of Saccharum, Arundo, Andropogon, and Anthistiria, which rise high enough to cover an elephant, and afford shelter during the greater part of the year for multitudes of tigers and other wild animals. At the commencement of the cold weather, this long grass is set on fire and burnt down by the inhabitants of the hills, who at that season descend to the level country to feed their cattle and flocks. It is again abandoned to itself at the commencement of the hot season, as soon as grassy vegetation has made sufficient progress in the mountains. These swampy tracts are a series of lateral valleys, which run parallel to the base of the mountains, and which, from being very slightly inclined, present great obstacles to the escape of the water discharged into them by numerous streams from the mountains.

Along many parts of the Himalaya, a similar series of valleys, nearly parallel to the axis of the chain, but bounded externally by hills of from 2000 to 4000 feet in elevation, may be observed. These valleys are known in the western Himalaya by the name of Dhúns. One of the largest of them is the Deyra Dhún, well known to Indian travellers as being traversed en route to Masuri, a favourite hill station, and now celebrated as the seat of an extensive cultivation of tea in a climate which seems to suit admirably that valuable plant. The Deyra Dhún is in its centre or highest part, from which it slopes down both to east and west towards the Ganges and Jumna, about 2500 feet above the level of the sea, or 1500 feet above the level of the plains, immediately outside of its bounding range.

Other Dhúns occur all along the hills to the westward. They are bounded on the north by the ancient rocks of the Himalaya, but on their outer side always by the tertiary sandstones and conglomerates, now so well known from the labours of Falconer and Cautley, as the Sewalik formation. In the north of the Punjab there are often several series of these valleys, the innermost only resting on transition rocks, the others excavated out of the tertiary sandstones, which have there often a width of from 30 to 50 miles.

The vegetation of the low ranges of hills by which the Dhúns are bounded externally, does not deviate much, if at all, from the tropical type. They nowhere exceed an elevation of 4000 feet, which is not sufficient in isolated ridges to bring about a sufficient change of mean temperature, to produce much alteration in the vegetation. They are only known, I believe, to the westward of Nepal, and therefore, in the drier parts of the region, they are generally covered with trees the same as those of the forest belt, with, in addition, a good deal of Pinus longifolia, a subtropical species of Pine, and of a dwarf species of Phœnix, almost the only palm of the western Himalaya.

From these valleys where they exist, or from the open plains in other cases, the exterior ranges of the Himalaya generally rise abruptly to a height of 7000 or 8000 feet, in all parts of the chain, except at the point of exit of the rivers, where of course the outline of the mountains is much modified. I shall probably better explain the structure of the mass of mountains, by saying that the lateral chain which separates any two adjacent river basins, generally terminates abruptly towards the plains in a bold promontory 7000 or 8000 feet in height, from which lateral branches parallel to the plains, run in each direction, gradually diminishing in elevation till they are terminated by the great rivers. After the first sudden rise, the different ridges increase much more gradually, generally running nearly level for a number of miles and then rising abruptly from 1000 to 2000 feet.

In ascending on the Himalaya (or indeed on any range of mountains) from the base to the line of perpetual snow, the change of vegetation is extremely gradual, and within a limited change of altitude barely perceptible, any division into groups must therefore be in a great measure arbitrary. Still some mode of subdivision is quite necessary for the purpose of description, as otherwise the mind would be puzzled by the multitude of facts. The less complicated, however, the mode of division is, the more intelligible it will be. It appears, therefore, quite sufficient to refer the forms of vegetation to three groups, similar to the three zones interposed between the equator and the pole—namely, tropical, temperate, and arctic; or to use the term more commonly applied in the case of mountains, *alpine* vegetation.

There is so great a diversity in the vegetation of different parts of the Himalaya, that I should entirely fail were I to attempt to give any general idea of the vegetation of these different zones. I shall therefore select two particular spots, and by relating in some detail the gradual changes of the vegetation in each of these, I shall, I hope, be able to give a good idea of the general appearance of the phenomena of vegetable life.

The hill station of Darjiling is distant from the plains of Bengal a little more than 36 miles, the road following a ridge which ascends in the first 13 miles rapidly to about 7000 feet, and then runs gradually, with little change of level, for the remainder of the way. Throughout the whole distance the mountain sides are lined with dense forests; except in the early morning, an almost perpetual mist hangs over the trees, which collect and throw down from their foliage an abundant supply of moisture. On emerging from the dry belt of tropical forests, the ascent commences at once up a dry ridge, covered at first with the same species as grow upon the plain, species of Bombax, Terminalia, Sterculia, Emblica Duabanga, Alstonia, Gmelina, Bauhinia, and others are abundant, with many figs, some species of Artocarpus, and a proportion of Bamboos. By degrees a vegetation characteristic of mountain tracts, but still tropical, takes the place of those just mentioned. A Gordonia is extremely abundant, with numerous trees allied to Mappa, various species of Garcinia, the Toon (Cedrela toona or serrata), a variety of mimoseous trees, arboreous species of Vernonia and Helicia, beautiful Bauhiniæ, both erect and scandent, the latter climbing to the tops of the highest trees with a trunk nearly as thick as a man. The road runs along the top, or on one side of the ridge, looking down into deep valleys full of the densest forest. If we leave the road to enter into these dark and moist hollows, we find that there are occasionally small tracts of flat land along the banks of the streams, which, however, more frequently run through deep ravines, clothed with dense thickets of shade-loving trees, species of Laurel, Alder, Magnolia, being mixed with the giant figs, which often form a great part of the forest. In these more shady places the Plantain and Tree-fern luxuriate, and a dense brushwood covers the ground. Not unfrequently large tracts are covered with thickets of Calamus, a prickly palm which attaches itself by long hooked flagelli to the trees, and often presents a formidable barrier to the traveller who tries to penetrate into its recesses. The trunks of these trees are often clothed with a dense mass of Pothos, and of the huge leaved Scindapsus, completely encircling them all round, and converting them into leafy columns, while the wide-spreading branches of r trees bear a profusion of Orchideæ, which overspread them, even top, and, when in flower, have a most gorgeous effect.

In shady valleys, as low as 2000 feet, appear the first specimens of Oaks and Chestnuts, which in the equable temperature of such places, descend much further on the mountain slopes than in the more arid and variable climate of the western Himalaya.

On attaining an elevation of about 6000 feet, the vegetation has become temperate. The purely tropical forms have almost entirely disappeared, and in their place the forest abounds in trees of temperate climes. Species of Oak, Holly, Cherry, Laurel, Rhododendron, Styrax, and Magnolia, of gigantic size, from the forest, densely covered with Mosses and Orchideæ, and with an underwood of species of Berberis, Daphne, Lonicera, many species of Vitis, and smaller species of Bamboo than those of the tropical region, Ferns are at such elevation extremely abundant.

From the station of Darjiling, the view in every direction overlooks mountain ranges, covered with dense forest, except in a few spots where partial clearances have been made for cultivation. No bare or grassy mountains meet the eye, no rocks or precipices afford any relief from the prevailing uniformity, which, but for the magnificence of the snowy mountains behind, would be undoubtedly monotonous and fatiguing.

The ascent from the plains of north-west India to Simla, is about the same length as that to Darjiling, but presents the most marked contrast in vegetation, being throughout bare and grassy. The road ascends at first in ten miles to an elevation of 6500 feet, then descends to about 1000 feet, and ascends gradually to 5000. The ascent commences from the Pinjore Dhún, a lateral valley which runs at the foot of the mountains from the Sutlej to the Jumna rivers. There is no forest in this valley, which is open, and to a great extent cultivated. The lower hills are covered with a shrubby vegetation, characteristic of a dry climate. Species of Zizyphus, Carissa, Butea, Adhatoda, Bergera, Ægle, Flacourtia, and other common shrubs, with one species of bamboo, and only one fig. After the ascent commences, these bushes are only scattered at intervals over the hills, the greater part of the surface being bare and grassy. A similar open country extends all the way to Simla, except where a few fir-trees (Pinus longifolia) crest the ridges, and in the more shady ravines, which are lined with a few small trees.

The transition from tropical to temperate vegetation begins, in so far as it is indicated by the small amount of shrubby vegetation, at about 5000 feet, but on the more exposed slopes, plants of warm climates extend up 1000 feet higher, and the herbaceous vegetation, principally grasses, is entirely composed of tropical forms.

It is only on approaching Simla, and attaining a height of nearly 7000 feet, that forest vegetation commences; at that elevation, open forests of Oak, Rhododendron, and Andromeda, intermixed with several species of Pines, and a great number of temperate shrubs, of such genera as Rosa, Rubus, Viburnum, Berberis, Spiraed, Lonicera, Indigofera, Prinsepia, Salix, Daphne, and others.

The view from Simla presents a very marked contrast with that from Darjiling. The general outline of the mountains is very much the same, but they are more rocky, and very generally bare; the forests, which to the north are dense and abundant, occupying chiefly the north slopes of the mountains, so that in looking from the south the crest of the ridges only are seen to be wooded. The scenery, therefore, is more diversified than in the eastern Himalaya, and abstracting the snowy mountains, more pleasing to the eye.

Between the two extremes which I have described, every intermediate form may of course be met with, the law of alteration being apparently the following, that in advancing westward towards less humid climates, the lower hills, from about 6000 to 2000 feet, become more and more bare and grassy, while the lower levels and the base of the mountains retain a greater degree of damp, and are clothed with forest. It would appear also that above 6000 or 7000 feet, up to 10,000 or 11,000 feet, at which elevation mountain ranges sensibly interrupt the passage of the moist atmosphere, the temperate ranges are more moist than those below them, which do not collect the clouds, and have a higher temperature, and consequently more powerful sun. To the eastward of Sikkim, the same phenomena are very well marked, the lower ranges being extremely dry and arid, while above 7000 feet, dense forest and a humid atmosphere prevail, just as in the mountains of Sikkim.

The valleys of the larger rivers, which traverse the Himalaya from north to south, have, of course, a much lower elevation than the mountains by which they are surrounded; and up them, therefore, tropical vegetation penetrates very far into the interior. In the extreme west, the valleys of the Indus and Chenab, and even of the Sutlej, are up to the height of 5000 feet, which they do not attain till more than 100 miles from their exit into the plains, hot, dry, and tropical. Further east, the tropical forest stretches far up the valleys, and they are only bare for a small portion of their extent, and in the humid atmosphere of Sikkim they are densely wooded throughout. In that province, the valleys of the Teesta and its tributaries carry tropical vegetation far into the interior, almost within a day's journey of the line of perpetual snow, and the luxuriance of the dense and dripping forest requires to be seen to be understood.

The temperate region of the Himalaya may be said to extend from about 5000 feet, or a little above it, to the upper limit of arboreous vegetation; which, to the westward, is about 12,000 feet, to the east about 1000 feet higher. Above 9000 feet, however, the temperate region is characterized by many remarkable forms, which do not extend lower; these are generally, in the west especially, of every European type; but in the eastern flora it is at such levels that the magnificent Rhododendrons of Sikkim, which form so striking a part of its flora, principally occur. In this zone a great part of the trees are of European genera, Alders, Oaks, Birch, Hazel, Hornbeam, Horse-chestnut, and Cherry being characteristic forms. It is also especially the region of coniferous trees, very few of which extend either below or above it. The pine which descends to the lowest level in the Himalaya, is Pinus longifolia, which is a common tree throughout the whole region from the mountains of the Punjab to the east of Bootan. It is confined in a great measure to the outer ranges of the mountains, and commences as low as 1000 feet above the level of the sea, rarely, if ever, attaining a greater elevation than 7000 feet. This tree appears to have a very great power of enduring varieties of climate, for it seems equally at home in the hot, damp valleys of Sikkim, surrounded by an entirely tropical vegetation; and on the dry, stony hills of the Punjab, where rain hardly ever falls, and it is at all seasons exposed to a powerful and scorching sun. The only other coniferous tree of low elevations in the Himalaya is Podocarpus, one species of which is a native of the lower ranges of Nepal and Sikkim.

Pinus excelsa, which is allied to P. strobus, and Pinus Smithiana, which is near abies, are the more common species of the central zone, which are distributed throughout the whole extent of the Himalaya. In the same zone, the Deodar (Cedrus deodara) is confined to the western mountains, not being, I believe, to be found indigenous in any part of Nepal; while P. Brunoniana, on the other hand, commences in the eastern parts of Kamoan, and extends as far east as Bootan. The most Alpine species of the family are P. Gerardiana, P. Webbiana, and several species of Juniper, of which all but the first, which is a western tree, seem universally distributed.

It would be needless to dwell at any length on the Alpine zone, because, luxuriant as is the vegetation, and beautiful as are the plants, the forms at least must be familiar to most of my auditors.

I must be content, in conclusion, with drawing your attention to the change produced in the vegetation in the temperate and sub-Alpine zones as we advance towards the interior of the mountains, in consequence of the diminution in the amount of rain.

If in travelling through the Himalaya we ascend a great river, the ascent is so very gradual, that the change of climate and of vegetation in ascending is almost imperceptible, and is only detected by careful observation. If, however, on the other hand, we cross a range of considerable elevation, and descend on its northern side into another valley, the transition is often very striking; and if the chain be sufficiently elevated to intercept the greater part of the rain, the contrast between its two sides is perfectly astonishing. When the transition is thus complete, the traveller leaves dense forests and common Himalayan vegetation on the one side, to find on the other a dry, barren, burnt-up soil, with scattered Astragali, Boragineæ, and Cruciferæ, of forms quite characteristic of the flora of Siberia. Such is the vegetation of Tibet, which may be reached either suddenly by crossing a lofty pass, or gradually by ascending the Indus, the Chenab, the Sutlej, the Ganges, and many other of the Himalayan rivers. This arid vegetation is met on the Sutlej as low as 10,000 feet above the level of the sea, and is therefore in no way dependent upon mere altitude.—*(Proceedings of the Philosophical Society of Glasgow.)*

Monthly Proceedings of the Society.

(Saturday, the 11th January, 1851.)

The Anniversary General Meeting was held on the 11th January 1851.

The Hon. Sir Lawrence Peel, President, in the chair.

The proceedings of the last General Meeting were read and confirmed.

Elections.

The Rev. Thomas Firminger; Messrs. William Ewing, W. L. Harwood, R. C. Bell, Walter Landale, James Church, Junior, W. Patton, George McNair, and Rajah Nurrender Kissen Bahadoor.

Proposals.

Baboo Prosononauth Roy, Zemindar, Digaputi, Nattore,—proposed by Baboo Peary Chand Mittra, seconded by Baboo Radhanauth Sikhdar.

A. C. Perroux, Esq., Pakparah factory, Rajshye,—proposed by Baboo P. C. Mittra, seconded by Baboo R. N. Sikhdar.

Dr. J. R. Withecombe, Civil Assistant Surgeon, Darjeeling,—proposed by Dr. A Campbell, seconded by the Honorary Secretary.

Lieut. H. W. Gulliver, Bengal Engineers,—proposed by Capt. W. Abercrombie, seconded by the Honorary Secretary.

N. Faudon, Esq., Merchant, Calcutta,—proposed by Mr. W. G. Rose, seconded by Mr. W. Storm.

Presentations.

1. Reports of the Bombay Chamber of Commerce from 1845 to 1850. *Presented by the Chamber.*

2. Journal of the Asiatic Society from October to December 1849, and for May 1850. *Presented by the Society.*

3. A collection of plants from Malacca, consisting of *Nepenthes*, or pitcher plants, of three species, *Orchids* of 5 sorts, the *durian*, the pepper-vine, a *Calamus*, and four other sorts. *Presented by George Moxon, Esq.*

4. An assortment of plants from the Straits, consisting of *mangosteens, rambotans, polassans, durians, jambroos, rambaees*, the Pinang *woongee*, or scented betle-nut, yielding a nut of an unusual size (one of which was submitted for the inspection of the meeting), *granadilas*, the India-rubber vine, from Borneo, chocolate nut, the *Gutta percha*, the Manilla hemp plant *(Musa textilis)*, and pine-apples of sorts, variegated, green, smooth-leaved and conical. *Presented by Dr. K. M. Scott.*

5. Two cocoanuts of an unusual size, measuring three feet in circumference, and 18 inches in length. *Presented by Major Bogle.*

Major Bogle mentions that these nuts are from Mergui, and that land fit for their production is available in the Tenasserim provinces to an unlimited extent. The Secretary stated he had solicited further information from Major Bogle regarding these nuts, whether they afforded milk and oil in proportion to their size, and whether they could be procured in any quantity for trial in the Society's garden and for distribution.

6. Two specimens of articles manufactured from the fibres of the plantain tree by the Nuns of Chittagong. *Presented by Mr. G. G. Mackintosh, C.S. on behalf of Mr. Robert Ince.*

7. A muster of alkanet root. *Presented by Major Charlton.*

Major Charlton mentions that the root, in a state similar to this muster, is occasionally brought to Almorah from Thibet in small quantities by the Bhotiahs, who do not appear to be aware of its value. It is said to be obtained in abundance, and indigenous to Thibet.

Dr. Falconer, to whom the above muster was submitted, states that it is not the produce of *Anchusa tinctoria*, or dyer's alkanet, but most probably the root of an allied species, *Onosma Emodi*, called *Maharunga* from the intensity of its dye. It gives, like alkanet, a most brilliant red color to oil, but affords only a dirty brown color to water. Specimens of both colors were placed on the table.*

8. Samples of cotton from Coimbatore. *Presented by Dr. Robert Wight, Superintendent Government Cotton Farms.*

A very handsome white rose plant, in blossom, and some large and exceedingly well-formed cut specimens of yellow *chrysanthemum*, both from the Society's garden, were placed on the table. The rose plant was presented some months ago to the garden by Mr. Dougherty of the Barrackpore Park.

In connection with the above, the President intimated his intention of presenting the Society's garden with a plant of the *white* leaved *Poinsettia pulcherrima*, recently received from England. Sir Lawrence further expressed his readiness to write to Sir Wm. Hooker for seeds of *Victoria regia* for the Society, which kind offer was immediately accepted.

Election of Officers and Council, and revision of Standing Committees.

The President intimated that, in accordance with the provisions of Chapter X. of the Bye-Laws, the Meeting had to elect (this being the Anniversary) Officers and Council for the current year. Some discussion having, hereupon, ensued, in regard to the construction of certain Sections of this Chapter, the following Resolution was moved by the President and unanimously agreed to :—" At a general meeting of the Members of the Agricultural and Horticultural Society, for the election of Officers of the Society, and of Members of the Council in lieu of the four who went out by rotation, it appearing to be doubtful on the construction of the existing rules, whether these Members of the Council are eligible to be elected on this vacancy; this question was postponed for consideration to an adjournment of this meeting, which stands adjourned by consent for this special purpose to the next general meeting of the Society, to be held on the 2d Saturday of the month of February next."

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* Dr. Porteous, of Messrs. Bathgate and Co., recognizes this root as identical with the *Rutton* of the Bazaar, which is used to dye oils for coloring woods the same as mahogany.

Col. Sage gave the following notice of motion for the next general meeting:—

"That as chapter 10, section 8 of the code of bye-laws, does not specify the ineligibility of the four members of the Council who go out by rotation, to re-election, the wording of the section shall be altered thus:—"four of whom shall go out by rotation, and shall not be re-elected until a period of twelve months has elapsed."

The President having next intimated that, in his opinion, the resolution above agreed to did not prevent the present meeting from entering on the special business of the day, and the members coinciding in this opinion, they proceeded to the ballot, appointing Messrs. Willis Earle and Hugh Fraser, scrutineers, who reported the result to be as follows:—

Office-Bearers for 1851.

President.—The Hon. Sir L. Peel.

Vice-Presidents.—The Hon. J. E. D. Bethune, Dr. Falconer, Baboo Ramanath Tagore, Rajah Pertapchunder Sing.

Honorary Secretary.—Mr. James Hume.

Deputy Secretary and Treasurer.—Mr. A. H. Blechynden.

Members of the Council.

Messrs. W. Storm, A. T. Peterson, James Church, senior, Willis Earle, A. Emerson and Dr. Huffnagle, in place of those who had vacated, and who go out by rotation.

On the recommendation of the Council, the following members were added to the Committees which required strengthening, in the room of three members who had retired from the Society or left the country:—

Cotton Committee.—Mr. James Cowell.

Implements of Husbandry, &c.—Capt. Hugh Fraser.

Nursery Garden Committee.—Mr. James Church, senior.

It being the opinion of the meeting that the other committees did not require strengthening, they remain as last year.

Annual Report from the Council.

A summary of the principal objects which have engaged the attention of the Society during the past year was submitted by the Council. The report states, among other topics, that the funds of the Society are in a satisfactory condition, and that the accession of members during 1850 has been greater than any previous year since 1843. Agreed, that the report be published in the next number of the Society's Journal, which will shortly be put to press.

Provision for Vegetable, Flower, and other descriptions of Seeds for 1851.

The following report regarding the provision of seeds for 1851, was next brought to the notice of the meeting :—

In accordance with the resolution of the General Meeting held in November last, "that the members of the Floricultural and Fruit and Kitchen Garden Committees report conjointly to the next General Meeting regarding the consignments of vegetable and flower seeds for next season," your Committee beg to report as follows : —

Seeds of Flowers (Annual and Perennial), of Bulbs and Fruit seeds from England.—As regards the consignment of English flower seeds received from Mr. Carter of London, your Committee are informed that various notices of a conflicting nature have been received ; but referring to the favorable reports lately sent in, and more especially those from A. Emerson, Esq., from Mr. Dougherty of the Barrackpore Park, and from the Society's Gardener, your Committee are inclined to believe that the assortment was, on the whole, received in fair germinating condition, and that failures have arisen rather from a want of proper care and mode of treatment, and in some instances perhaps from inclemency of season than from any inherent defect in the seeds themselves. Under these circumstances they are disposed to recommend that another consignment be ordered from Mr. Carter, the list varying somewhat from that sent last year for his guidance, by the omission of about 10 or 12 sorts, which have now become common, and the substitution of a like number of rarer kinds, as per list annexed (A.) also by the addition of mixed seeds representing all the species noted in Carter's catalogue, instead of two or three only of each kind, as has heretofore been the custom. This desirable change, it is supposed, can be accomplished by an increase of about £14 or £16 on the charge of last year's consignment which amounted to £146.

It would also be desirable to indent for a selection, say of about 40 kinds, of the best perennials (see list B.) sufficient to be subdivided into 50 packets, for distribution among such of the members resident and non-resident as are known to take an interest in floriculture, and will promise to communicate the result. An equal quantity of bulbs, of 8 or 10 kinds, and of fruit-stones and seeds (see list C.) might likewise be ordered with the same object in view. An advertisement stating the terms under which these bulbs and additional supplies of seeds will be given, could be inserted in the daily papers a couple of months prior to their arrival. To meet these extra indents, a sum not exceeding £50 or £60 might be allowed.

Vegetable, Cotton and Tobacco Seeds from the United States.—The consignment of vegetable seeds from Mr. Landreth of Philadelphia, having given general satisfaction, as *regards quality,* your Committee are prepared to suggest a repetition of the order, and on the same list (D.) (with a trifling alteration), as was sent last year for his guidance. They are not disposed to limit Mr. Landreth strictly to this list, but, on the contrary, would give him some discretion to send new and esteemed kinds, not named, and if, of what he would call the half-hardy and tenderer sorts, the more likely they would be to answer here. They would recommend that a *larger quantity* of seed be given of each description than was furnished on the last occasion, especially of the *Brassica* tribe and a few others. As the order is a large one (amounting to Sp. Drs. 877, exclusive of freight, insurance, and other charges), this additional supply should be given,—the Committee think,—without any additional charge. The same quantity of maize might be sent as before, but an extra quantity of cotton seed, of the black and green-seeded varieties, to meet a probable demand next season, say to the extent of Sp. Drs. 100, and a few ounces of Cuba and Havanna tobacco seeds. These two (cotton and tobacco) should be despatched as soon after the receipt of the order as practicable to reach this in time for the sowing season, June and July.

Vegetable Seeds from the Cape.—The above remarks as regards the goodness of seed being equally applicable to the supply furnished by Messrs. Villet of the Cape of Good Hope, the order might be renewed. Messrs. Villet have not, however, adhered so closely to the list, as Mr. Landreth; and have despatched a few undesirable kinds in place of those ordered; it would therefore be advisable that another list (E.) be sent for their guidance, to which they should attend as closely as circumstances will permit.

In order to accommodate members desirous of obtaining additional quantities of particular descriptions of vegetable seeds, which cannot now be effected without breaking entire parcels, it would be desirable to indent from the United States and the Cape for a small supply, *in bulk*, of each sort of seed noted in the list;—say two or three pounds weight of cauliflower—the same of cabbages of sorts—and rather larger quantities of more bulky and heavy seeds: the cost for this would be trifling, compared to the accommodation it would afford.

Referring to the suggestion of a Member of the Committee in regard to the ordering of extra supplies of vegetable seeds for members wishing to obtain more than their allotted shares, it might perhaps be best met by directing that 100 or 150 additional packets be indented for from the Cape, and the same number from the United States, and be made available to subscribers at the cost price, no member being entitled to receive more than two packets, as his additional quantum. The residue might be disposed of to the public generally at twice the original cost. The names of members could be registered a month or so before the probable time of the arrival of the consignments, say from 15th of June, and closed on 31st July, with the view of enabling the Secretary to determine on the number of additional packets that may be required on that account, and the number available for non-subscribers. It will be optional with members to receive a double supply of vegetable or flower seeds so long as there is a surplus.

Vegetable Seeds from Van Dieman's Land.—The trial assortment of vegetable seeds obtained in June last from Mr. Lipscombe of Hobart Town, though not very satisfactory, has been sufficiently so to induce your Committee to recommend a further testing, by giving him a moderate order of 100 parcels, each containing 20 of the most desirable sorts; the limit for each parcel not to exceed that of the Cape Seedsmen for similar quantities, or say six shillings per packet, exclusive of shipping and other charges. The Committee conceive that, in the absence of steam communication with Australia, sailing ships afford sufficient chance for making a fair direct trial. Moreover, the season for gathering *there* and of sowing *here*, so happily accommodating each other, would probably ensure a successful result, as such seeds could be put in the ground in 7 or 8 months from the time of reaping. Mr. Lipscombe could further be invited to send a list of all such kitchen garden seeds, indigenous fruit, flower, &c. seeds, as he produces and collects, with prices. A few samples of each might also be requested.

Vegetable Seeds from Edinburgh.—The out-turn of the trial assortment of vegetable seeds from Messrs. P. Lawson and Son, which was forwarded by the *June* overland mail, has proved less successful than that from Van Dieman's Land. Nevertheless, your Committee recommend that a portion of the *free* tonnage granted by the P. and O. Company be occupied by another consignment from the same firm—of *well ripened and dried seeds of the season, by the latest steamer.* As this consignment will be of service only to resident members and those within a radius of 150 miles round Calcutta, as it cannot be received before November, that from Hobart Town, which will probably reach in July or August, might be appropriated for subscribers in Upper India. Messrs. Lawson might be requested to forward 100 parcels containing the kinds noted in their list No. 1, received in August last, with the exception of peas and beans, which would make the despatch too bulky for overland conveyance. The cost will not exceed 300 Rs.

Seeds of indigenous plants, ornamental and useful, from Australia, Cape of Good Hope, N. and S. America, and China.—Referring to the communication from Major Jenkins, your Committee think it would be very desirable were steps taken to carry into effect his suggestions respecting the importation of seeds of ornamental shrubs and plants from Australia, the Cape of Good Hope, N. and S. America and China; they would even go further and recommend that seeds and stones of fruit trees, such as are not known in India or are scarce, or have degenerated, be likewise obtained. An application might be made to the Society's Seedsmen at the Cape and Philadelphia, for lists of such indigenous shrubs and trees as they would undertake to supply, with their prices: and perhaps some of the members may have correspondents in South America, China and Australia, who would assist the Society in obtaining seeds from those countries.

Your Committee beg to annex to this report, in addition to the lists A. to F. already alluded to, another memo: (G.) of the probable total cost of the consignments for next season, amounting in the aggregate to Rupees 6,924—say Rs. 7,000, exclusive of freight, insurance, &c., being Rs. 1,800 more than the cost of the consignments of the previous year.

In conclusion, your Committee would recommend, with reference to the resolution passed at the last General Meeting, that the shows of the season of flowers and vegetables and fruits be held in the Auckland Circus on Friday, the 24th of January, on Saturday, the 1st of March, and on Friday, the 11th of April, three shows in all.

WM. SAGE.	PEARY CHAND MITTRA.
W. EARLE.	H. ALEXANDER
W. G. ROSE.	H. FALCONER.

Calcutta, *2nd Jany.* 1851.

A recommendation from the Council in favor of the adoption of the above report, with the addition of an order for 100 extra packets of *flower* seeds, was agreed to. It was also resolved that the anniversary dinner be held on Friday, the 24th of January, and that Messrs. Huffnagle, Hume, Rose and Col. Sage form the committee to make the necessary arrangements.

A recommendation from the Council, for a monthly increase of 9 Rs. to the native establishment, was also brought forward, and agreed to.

Col. Sage desired to give, seconded by the President, the following notice of motion for the next general meeting :—

" That as the funds of the Society are in a highly prosperous condition, and as the duties of the Deputy Secretary are onerous, and occupy the whole of his time, and have, for 14 years, been discharged with singular zeal and ability, that his salary be raised from 300 to Rs. 400 per mensem from the 1st January, 1851."

The Gardener's monthly report was read. Mr. McMurray mentions that 69 of the 104 kinds of seeds of perennials received from Mr. Carter, have germinated. That the narcissus bulbs presented by Mrs. Macleod are making a healthy growth, as also the crocus bulbs received from Mr. Francisco Pereira. That the bulbs of tulips, hyacinths, gladiolus, and narcissus contributed by Dr. Strong, are doing well, but the crocus and snow-drops have only partially germinated. That with the exception of six plants, the whole of the collection presented by Mr. Moxon, consisting of 38 plants, were received in good condition. The Gardener concludes his report by drawing attention to the *Combretum comosum* trained over one of the arbors on the west side of the flower garden ; it is a beautiful specimen, and is now in full flower.

Communications on various subjects.

The following papers were likewise submitted :—

1. From Dr. Robert Wight, Superintendent of Government Cotton Experiments, forwarding an account regarding late operations in Cotton culture at Coimbatore.

2. From Capt. G. E. Hollings,—observations regarding the state of agriculture, &c., in the district of Leia in the Punjaub. The above two communications were referred to the Committee of Papers.

3. From A. Emerson, Esq., notifying that the English Flower seeds received from the Society, have succeeded very well with him, and describing his mode of treatment, which is as follows;—

"The *gumlas* were drained as usual with broken tiles and about two inches of the *soorkee* deposit washed into the drains from the walks during the rains. The pots were then filled within two inches of the top with a well prepared compost of 5 parts old loam, 2 of well-rotted cow dung, 2 of leaf mould, and one of coarse dry land sand, all mixed and turned over in the sun regularly for 10 or 14 days. The seeds were then sown and merely covered *out of sight* with 2-3rd fine sifted leaf mould and 1-3rd peat (dried in the sun for several days) and passed over the seeds through a fine sieve, 1-16th of an inch to the mesh. In 8 days most shewed signs of germinating, when they were put out at night under the dew, and placed under cover about 8 o'clock in the morning, or, so soon as the sun gained strength. And afterwards left out for acclimatizing night and day in a North-Eastern aspect, keeping them moulded up until transplanting out whenever they may be required."

4. From Mr. Dougherty, of the Barrackpore Park, reporting favorably on the assortment of English flower seeds (Carter's) received from the Society. "Although sown in beds, and exposed to nearly 24 hours' rain, a portion of each kind vegetated, with very few exceptions."

5. Prom Lieut. John Eliot, giving a brief account of the result of his sowings of various batches of seeds received from the Society during 1850.

6. From a member, giving the following extract of a letter from a correspondent in the Rajshaye district:—

"In travelling through the district, I have been much interested in a *new oil seed* now being cultivated by the Messrs. Watson, or rather by some of their assistants, on their own account. It is called *Soorgunga*, and grows in luxuriance in *refuse* lands or lands exhausted of their strength by other produce. The oil is capital for painting and cleaning machinery, and also for burning. The best of it is that it grows on exhausted soil and is not touched by the cattle."

It was stated to the meeting that the seed (of which a small sample was submitted) is the *Sirgooja* or *Ramtil* (*Verbesina sativa*, Roxb:), regarding which some particulars will be found in the Society's Journal, Vol. VII. page 40.

(Saturday, the 8th February, 1851.)

Rajah Pertap Chunder Sing, Vice-President, in the chair.

The proceedings of the last General Meeting were read and confirmed.

Elections.

Baboo Prosononauth Roy, Dr. J. R. Withecombe, Lieut. H. W. Gulliver, Messrs. A. C. Perroux and N. Faudon.

Proposals.

Brigadier Pattle, C.B.,—proposed by Dr. Falconer, seconded by Mr. Grote.

J. B. Elliot, Esq., Patna,—proposed by Mr. M. Gladstone, seconded by Mr. James Church, Senior.

Prince Mahomed Ruffeeoodeen,—proposed by Dr. Strong, seconded by Mr. W. G. Rose.

R. Berkeley, Esq., Extra Assistant Commissioner in the Juny district of the Punjaub,—proposed by Lieut.-Col. Stuart Corbett, C.B., seconded by the Honorary Secretary.

William Haworth, Esq., Merchant, Calcutta,—proposed by Mr. James Church, Senior, seconded by Mr. A. T. Peterson.

Mr. William Martin, of Darjeeling,—proposed by Dr. Campbell, seconded by the Honorary Secretary.

Presentations.

1. Two copies of the "Geological Survey Report, Season 1848-49." *Presented by the Government of Bengal.*

2. Ten copies of "the Natural Productions of the Tenasserim Provinces and the Burman Empire," by the Rev. F. Mason. *Presented by Major Bogle.*

3. Journal of the Eastern Archipelago, for Dec. 1850. *Presented by the Government of Bengal.*

4. Journal of the Asiatic Society of Bengal, No. 6 of 1850. *Presented by the Society.*

5. A plant of *Poinsettia pulcherrima alba. Presented by Sir L. Peel.*

6. Two plants of the Darjeeling *Fuchsia. Presented by J. Bean, Esq.*

7. A quantity of plants of the *Koomlah* pine-apple of Sylhet. *Presented by M. Shawe, Esq.*

8. A collection of Cape bulbs. *Presented by W. H Elliott, Esq.*

(A report respecting the above plants and bulbs will be found in the body of the proceedings.)

9. Sixteen seeds of *Victoria regia. Presented by Dr. Wallich.*

Dr. Wallich mentions that these seeds (which were entrusted to the care of Lieut.-Colonel W. Alexander, C.B., and received by the last Steamer) were ripened at the Duke of Northumberland's garden at Syon, Isleworth. "It has been suggested to me," observes Dr. Wallich, "as the likeliest mode of preserving the seeds, to place them in a little vial with water and cotton. I have adopted the plan, and heartily glad shall I be, if the seeds should preserve their power of vegetation, and arrive in a safe and sound state. Kindly let me know. Should the method fail, I promise you, to send other supplies until we succeed. The vial is plunged in a small tin case. I beg you will suggest to me, how I can be of service to our most valuable Society. Present my humble and respectful services to them, with my best wishes for their continued success and prosperity."

Proposed by Dr. Falconer, and resolved unanimously, that the best thanks of the Society be given to Dr. Wallich, for this most acceptable donation, and for his continued mindfulness of them, though so far removed from the scene of their operations.

It was agreed that one-half of these seeds be transferred to Dr. Falconer for trial in the Botanic Garden,—one-half of the plants raised therefrom to be given to the Society,—and the other moiety to the Society's Gardener.

10. A quantity of Simlah grown potatoes. *Presented by Mrs. Macleod.*

11. Specimen of sugar from the cocoanut tree; of tapioca, raised and manufactured in the Straits, closely resembling pearl sago; a pod of the chocolate nut; and nutmegs in various stages of growth. *Presented by Dr. K. M. Scott.*

Dr. Scott states that the juice from which this sugar, or *goor*, is made, is obtained by cutting off the end of the flower shoot; it is then collected in bamboo *choongahs* and boiled.

12. Three pieces of Bancoorah teak. *Presented by T. B. Mactier, Esq.*

It was resolved that these pieces should be made up into articles of furniture for the Society's rooms.

13. Specimens of Chinese vegetable tallow (*Stillingia sebifera*) in a moulded state; of the oil of the same tree; of *Pela*, or Chinese insect-wax [*Flata limbata* ?]; of red, white, and other descriptions of rice; of paper and rope made from the stalks of rice, for wrapping purposes; of a dye employed for dyeing cotton cloth green (*Cassia sophora* ?); of pods and seeds of the Chinese vegetable soap; of soap and a cosmetic made therefrom; and seeds of beans, tomato, &c. *Presented by Dr. D. J. Macgowan, of Ningpo.*

A few healthy-looking plants of *Calceolaria*, raised in Mrs. Macleod's garden from Simla seed, were also placed on the table.

The motion No. 1, of which notice, to the following effect, was given by Colonel Sage, at the last general meeting, was brought forward:—

"That as Chapter X. Section 8, of the code of Bye-laws, does not specify the ineligibility of the four members of the Council who go out by rotation, to re-election, the wording of the section shall be altered thus:—"four of whom shall go out by rotation, and shall not be re-elected until a period of twelve months has elapsed."

In connection with the above the following recommendation from the Council was submitted:—

"That in lieu of the proposal of Col. Sage for the addition of the following words to Section 8 of Chapter X. "and shall not be re-elected until a period of twelve months has elapsed," the Council recommend that the following alteration be made in chapter X.:—

"That the words, "four of whom shall go out by rotation" be withdrawn from Section 8—and that the following words be substituted for Section 3:—

"The President and Council shall, previous to the meeting, nominate the persons whom they recommend for election as Office-Bearers and Council; and balloting lists containing the names of the members recommended, leaving a blank column opposite for such alterations, as members may wish to make, shall be prepared one week before the day of election. A copy of the list shall be handed to each member present at the meeting, and should he disapprove of any name or names, or be desirous of inserting some other name or names, he shall erase or insert accordingly."

Further, that the words "or Council" be added to Section 5, after the word "Officers."

Proposed by Dr. Falconer, seconded by Baboo Peary Chund Mittra, as an amendment on Colonel Sage's motion, that the recommendations of the Council be received. Carried unanimously.

The motion No. 2, of which notice was also given by Colonel Sage, was next brought forward, namely :—"That as the funds of the Society are in a highly prosperous condition, and as the duties of the Deputy Secretary are onerous, and occupy the whole of his time, and have for 14 years, been discharged with singular zeal and ability, that his salary be raised from Rs. 300 to Rs. 400 per mensem from the first January 1851."

In the absence of the President, the motion was seconded by Dr. Falconer.

A resolution of the Council, recommendatory of the above motion, having been read, it was moved by Mr. W. Byrne, seconded by Mr. M. Staunton, that the following words be added to Colonel Sage's motion :—"That the increase of Rs. 100 to Mr. Blechynden's salary be considered as personal allowance to Mr. Blechynden, granted in recognition of his long and highly meritorious services." The motion, with the above addition, was then put to the vote, and carried unanimously.

Read a letter from Dr. Falconer, notifying his resignation of the office of a Vice-President, to which he was elected at the last Anniversary Meeting, in consequence of its interfering with official engagements on the established days and hours of the Society's Meetings. Dr. Falconer adds, that he is desirous, at the same time, to offer his best acknowledgments of the honor which has been conferred on him by the election. Read extract from the proceedings of the monthly Meeting of the Council, recommending, (as authorised by the provisions of Section 5, of Chapter X. of the Bye-Laws) that Mr. W. G. Rose be proposed to fill the vacant office.

The recommendation of the Council, on being put from the chair, was carried unanimously.

Read a letter from Dr. Huffnagle, intimating that he is compelled to resign the office of a member of the Council, to which he was nominated at the last Anniversary Meeting, as also the offices of a member of the Finance, Garden, and Cotton Committees. Dr. Huffnagle observes, "while I shall feel always happy to prove useful in promoting the views and objects of the Society in my private capacity, I must decline taking an active part in its public duties."

A recommendation from the Council, that Mr. Grote be elected to fill the vacancy in the Council, caused by the resignation of Dr. Huffnagle, was unanimously agreed to.

Read letters from the Hon'ble Mr. Bethune, accepting the office of a Vice-President of the Society; from Mr. W. Storm of the office of a member of the Council; and from Mr. James Cowell of the post of a member of the Cotton Committee.

Defaulters to the Society.

The Council having submitted the names of ten members, whose subscriptions aggregate Rs. 1,412, and who had failed to respond to the calls made on them, it was resolved that, in accordance with the provisions of section 7, ch. 3 of the Bye-Laws, they be published in the proceedings of the Society as defaulters. Their names are as follows :—Mr. G. R. Gordon, of Moulmein; Mr. Allan Campbell Dunlop, Junior; Mr. J. P. Wise, of Dacca; Mr. James Hills, Junior, late of Kishnaghur; Lieut. S. W. Stokes, Horse Artillery; Lieut. H. LeG. Bruce, Horse Artillery; Talib Ally Khan, of Gya; Baboo Cossinauth Dutt; Baboo Nursing Chunder Bhose, and Mr. J. H. Mather.

Horti-Floricultural Exhibitions.

The following reports from the judges regarding the exhibitions of flowers, vegetables, and fruits held in the Auckland Circus on the 24th January, were next read :—

Flower Show.—The judges have to report, that though several well-grown plants were brought forward, and a few novelties exhibited, the show was altogether an indifferent one, it being too early in the season for the majority of annuals,—for the bulbous and orchid tribes,—and too late for several other descriptions, such as *dahlias, chrysanthemums,*&c. Among the novelties were the white-leaved *Poinsettia,* a *Cyrtoceras reflexum* and *Abutilon Bedfordiana,* all from Sir L. Peel's garden; three fine plants of a white-flowered *Camellia,* from the gardens of Mr. C. J. Sutherland and Baboo Manick Chunder Sen; and a few plants of *Inga Hæmatoxylon.* In the list of well-grown plants, may be mentioned several specimens of *Euphorbia Jacquiniflora,* one, in particular, from the Barrackpore Park, was probably the handsomest that has been exhibited; also *Pelargoniums* of 8 or 10 kinds; *Maurandyas (Rosea* and *Barclayana)* and heart's-ease, with large, and, n some instances, well-formed flowers. The collections of violets and pinks were tolerably large, some roses of rarer sorts were also shown, and a few plants of *Clerodendron splendens.* Of *verbenas, portulacas, phloxes, martynias* and such like, the assortment was small; but larger collections may be expected at the next exhibition.

The general arrangements for the display of the flowers was equally as good as on the last occasion. The competition was tolerably spirited; the produce of from 30 to 32 gardens being represented, to 25 of which, prizes to the extent of Rs. 146, were awarded, as per detailed list herewith annexed.

Vegetable and Fruit Show.—The judges have the pleasure to report that the result of the late horticultural show was, on the whole, highly satisfactory. As regards vegetables, they have to remark that the celery shewed a decided improvement; a silver medal was awarded to the best specimen, consisting of two large bundles of uniformly good appearance, well blanched and weighty; the other specimens, to which money prizes were given, were also very fine. The turnips were, in general, well represented; a silver medal was given for the best "American flat turnip;" another, to the owner of the best description of keeping potato, a close-grained root of rough skin and smooth eyes; and a fourth medal for Windsor bean of very good quality, but the only specimen. Of the *Brassica* tribe, cauliflowers, brocoli, cabbages of 5 or 6 kinds, (including the Savoy, red, sugar-loaf, and drumhead sorts,) were well shown. Endives, well blanched; coss lettuce of good kinds, and in large quantity, were also brought forward. The peas were well represented, especially the imperial blue and marrowfat kinds. Of long blood beet there was none, but a prize was awarded to a good specimen of the turnip-rooted sort, of close grain and rich color. The leeks were good for the time of year. Several baskets of squash were exhibited; also of tomatoes and turnip and long scarlet radish, with a few artichokes and a collection of sweet herbs.

In respect to fruits, the judges have to observe, that the collection was not so large as of vegetables, the present not being the most favorable season of the year for such products. Among those, for which prizes were given, may be included a large collection of sapotas, fine specimens of pomegranates, bale of an unusally large size, sweet limes, and oranges raised in the neighbourhood of Calcutta.

The competition was great, upwards of 250 gardeners were in attendance, their produce occupying two-thirds of the space allotted, namely, 1500 feet, the other third, or 750 feet, being occupied by flowers. The arrangements of the vegetables and fruits were excellent, thereby considerably lessening the labors of the judges. In addition to the four silver medals above referred to, prizes in money amounting to Rs. 261, were awarded to 50 other mallees for the specimens detailed in the annexed list.

Nursery Garden.

The Gardener's monthly statement was submitted. Mr. McMurray reports favorably of the collection of Cape bulbs presented by Mr. W. H. Elliott: of the 14 sorts, consisting of 73 bulbs, all with one exception, are in good condition. Of the 217 "Koomla" pines of Sylhet, received from Mr. M. Shawe, 37 were found to be dead, and the others appear to have suffered from over-watering. One of the *Fuchsia* plants contributed by Mr. J. Bean, arrived in a healthy condition; the other in a dying state. The plant of *Poinsettia alba*, presented by Sir L. Peel, continues in a healthy condition. The tea seed received from the Botanic Garden at Saharunpore in November last, has germinated freely. Five of thirteen kinds of seeds received in December last from the Royal Botanic Garden at Ceylon have come up. All the Straits' plants contributed last month by Dr. K. M. Scott, continue healthy. The Gardener concludes his report by alluding to the beautiful example of *Bignonia venusta*, received from the late Mr. George Wood, and which is trained over the conservatory; it is now in full flower, and is, probably, the largest and finest specimen to be met with in Calcutta or its vicinity.

Communications on various subjects.

The following letters were likewise submitted :—

1. From Dr. D. J. Macgowan, of Ningpo, forwarding a paper on the uses of the *Stillingia sebifera*, or tallow tree ; with a notice of the "Pela" or insect-wax of China. Referred to the Committee of Papers.

At the suggestion of Dr. Falconer it was agreed that, in returning to Dr. Macgowan the best acknowledgments of the Society for the above communication, his attention be invited to the so-called "Rice paper" of China, with the view of affording the Society all the information in his power regarding the plant yielding it, the same being still a moot question and of considerable interest.

2. From Lieut.-Col. Stuart Corbett, C.B., dated 26th January, from Hajeepore, in the Punjaub, reporting favorably on all the seeds received during last year from the Society, with the exception of the batch from Edinburgh. "The flower seeds which"—remarks Col. Corbett—"I see many complain of, have, with three or four exceptions, germinated freely, but owing to the cold are rather backward."

3. From Major Bogle, in reply to enquiries regarding the large description of cocoanut, of which specimens were presented by him at the last meeting. Major Bogle observes, "as regards these cocoanuts, beyond mentioning the fact that they grow very luxuriantly all over these Provinces, and most particularly large and in great numbers at Mergui, I am sorry I can give you no information, as I do not know any one who has ever compared the produce of oil obtainable from them with the produce of any other cocoanuts. As to milk, however, or rather water, when green the largest is found to be quite full."

4. From Mr. Speede, reporting on the bulbs received from the Society, and suggesting that the Society purchase some of the fruit trees and flower plants lately brought out from France by Messrs. Arnol and Godfré, and which Mr. Speede reports to be in beautiful condition and fit for immediate planting.

Referred to the Garden Committee.

(*Saturday, the 8th March*, 1851.)

William Storm, Esq., Senior Member, present, in the chair.

The minutes of the last meeting having been read, it was resolved, that they be confirmed, with the exception of the elections of Mr. W. G. Rose, as a Vice-President, and Mr. Grote as a Member of the Council, which the meeting considered null and void, in consequence of their not having been in conformity with Section 5, of Chapter X. of the Bye-Laws.

Moved by Dr. Falconer, seconded by Baboo Peary Chund Mittra, and resolved unanimously, that the recommendation of the Council, of which notice was given at the last general meeting, proposing Mr. W. G. Rose to fill the vacant office of Vice-President, be adopted.

Moved by Dr. Falconer, seconded by Mr. Macleod Wylie, and resolved unanimously, that the recommendation of the Council, of which notice was given at the last general meeting, proposing Mr. Arthur Grote to fill the vacancy in the Council, be adopted.

Elections.

Brigadier Pattle, C.B., Prince Mahomed Ruffecoodeen, Messrs. J. B. Elliot, R. Berkeley, William Haworth, and William Martin.

Proposals, as Ordinary Members.

F. M. Lind, Esq., C.S., Allahabad,—proposed by Mr. R. Lowther, seconded by the Honorary Secretary.

Stewart Douglas, Esq., Merchant, Calcutta,—proposed by Mr. James Church, Senior, seconded by Mr. Arthur Grote.

E. H. C. Monckton, Eq., C.S.; Humeerpore,—proposed by the Honorary Secretary, seconded by Mr. W. G. Rose.

Lieut.-Col. J. Alexander, C.B., Gun-Carriage Agent, Futteeghur,—proposed by the Honorary Secretary, seconded by Mr. W. Storm.

Corresponding Member.

Dr. D. J. Macgowan, of Ningpo, was proposed, on the recommendation of the Council, as a Corresponding Member.

Read the following resolution of the Council on a letter of resignation from Mr. Hume of the office of Honorary Secretary to the Society :—

" *Resolved*,—that, the Council cannot submit this letter of resignation to the next general meeting without expressing their regret at Mr. Hume's retirement, and at the loss of his valuable services, extending over a period of 8 years ; and they doubt not, the same will meet with a suitable acknowledgement from the Society."

Read the letter in question :—

To the President and Council of the Agri-Horticultural Society of India.

Gentlemen,—As I feel it improbable that I shall be able to attend the meetings of your Society for the future, with the regularity I have hitherto observed, I think it right to resign the office of Honorary Secretary which I have had the honor to hold since January 1843.

The long services and valuable qualifications of the Deputy Secretary, Mr. Blechynden, to which I have so frequently borne testimony, and which have been recently recognized by the Society, assure me that the Society can in no respect suffer by my secession.

Conscious that I have been unable to do much, if any thing, for the Society out of my own immediate department, it is satisfactory to me to feel that I have given every consideration to its duties which my other avocations have permitted, and that out of the 104 meetings—general and special—held between my appointment and the close of 1850, I was present at 94. It has been my good fortune to be thus intimately connected with the Society, while it has been steadily advancing in prosperity, and growing in usefulnessand public favor, and this must ever give me an additional interest in its future career.

I have, &c.,

GARDEN REACH : *March* 4, 1851. (Signed) JAMES HUME.

Proposed by Dr. Falconer, seconded by Mr. M. Wylie, and resolved,—that it be referred to the Council to report as to the most suitable mode of acknowledging Mr Hume's services as Honorary Secretary.

Moved by Dr. Falconer, seconded by Baboo P. C. Mittra, and resolved,—that the matter of the Honorary Secretary's retirement be also referred to the Council to report on the expediency, or otherwise of filling up the vacancy.

A notice for the next meeting from the Council, recommending Col. Sage to fill the vacancy in the Council, caused by the election of Mr. Rose to a Vice-Presidentship, was next submitted.

Presentations.

The following contributions were brought to notice:—

1. Madras Journal of Literature and Science, No. 37. *Presented by the Madras Literary Society.*

2. Williams's Geological Report on the Damoodah Valley (2 copies). *Presented by the Government of Bengal.*

3. Journal of the Indian Archipelago, January 1851. *Presented by the Editor.*

4. A copy of the same work, for the same month. *Presented by the Government of Bengal.*

5. A ground-plan of the Metcalfe Hall, surveyed and *Presented by Mr. Paul Agabeg.*

6. A plant of *Laburnum*. *Presented by Capt. H. B. Weston.*

7. Twenty-three kinds of cucumber seed. and 22 of melon seed. *Presented by Sir L. Peel.*

8. A few seeds of six kinds of melon received from England in December and January. *Presented by W. Earle, Esq.*

9. A few seeds of vegetable marrow, raised in his garden at Cawnpore. *Presented by Lieut. John Eliot.*

10. A small quantity of fresh coffee seed from his plantation at Hazaree-
Presented by Mr. C. Wheeler.

11. A supply of seeds of Himalayan *Coniferæ*, and of senna seed. *Presented by Dr. Jameson.*

12. A quantity of seed-paddy from New Granada, termed "Arros de Loma," or Hill Rice. *Presented by Messrs. Gillanders, Arbuthnot and Co., to whom it was sent by Mr. Peter Serjeantson of Liverpool.*

The following is extract of a letter from Mr. Jordon of New Granada, the Correspondent of Mr. Serjeantson :—" This rice is, I believe, peculiar to the province of Manquita, in New Granada, and is cultivated in the following manner, in dry, sandy, or gravelly hills (never in marshy countries or where irrigation is used), and in climates varying from 70 to 85 degrees of Farenheit Thermometer. It is sown in the middle of March or middle of August, in shallow holes made with a stick, not more than 2 to 3 inches deep, 4 or 5 grains in each hole, which are about 14 inches apart, the ground being merely cleared of the weeds by burning or the hoe. The first crop is ripe in three months after sowing, when cut down it springs again, and yields a second crop in a month or six weeks after the first, and even a third has been obtained. The two last are however not so abundant as the first, though still a great desideratum. It should be cleaned with the hoe when weeds spring up, and when cut green is an excellent fodder for cattle or horses. The grain is rather smaller than that of the " Arros de Cienega," or Marsh Rice, but whiter and more esteemed. It can be kept without spoiling for an almost indefinite period. I shall feel much obliged by this small parcel being forwarded through some intelligent person to the East Indies for the purpose of being sown in favorable situations, being convinced that from its peculiar qualities, especially in not requiring irrigation, it may prove an inestimable blessing in that country."

A notice from the Council recommending that portions of this paddy be sent to certain localities and individuals as detailed, wa submitted and agreed to.

13. Two musters of indigenous cotton raised at Meerut. *Presented by C. Gubbins, Esq.*

The minutes of the Cotton Committee reporting on the above musters of cotton from Mr. Gubbins, as also on those lately received from Dr. Wight and Dr. Campbell, were submitted, and referred to the Committee of Papers.

A report from the Gardener was next read.

Mr. McMurray states, among other matters, that the New Granada seed-paddy has germinated freely ; that several of the cucumber and melon seeds, received from Sir L. Peel and Mr. Earle, have come up ; and that the wild asparagus raised from Col. Corbett's Punjaub seed continues in a healthy condition.

Communications on various subjects.

Read the following letters:—

1. From Major Jenkins, submitting a few more particulars from Mr. Masters regarding the tapioca plant of Assam, with specimens of leaves and roots. Referred to Dr. Falconer, who kindly undertook to examine these specimens, with others from the same quarter, which had been previously submitted to him.

2. From A. Wallace, Esq., furnishing a London Broker's report regarding a small experimental shipment of "Ramtil" or "Sirgoojah" seed, made in the early part of 1850. Referred to the Committee of Papers.

3. From Lieut.-Col. T. E. A. Napleton, Honorary Secretary, Branch Agricultural and Horticultural Society at Delhi, requesting some pecuniary assistance in completing their newly organized public garden. Col. Napleton remarks;—"The donations up to the present time amount to Rs. 1510, and the expenses incurred to exactly the same sum. The monthly subscriptions are just sufficient to pay the garden establishment. To complete the conservatory, summer-houses, water-courses, a reservoir to hold the canal water, and to lay down gravel on the carriage drives and walks, will cost about 800 Rs., and we much hope the Parent Society will assist us with a portion of that sum. The soil of about two-thirds of our public garden is excellent, and in another year we hope it may be second to none of the Branch Institutions."

A resolution of the Council, intimating that they could not recommend a compliance with the above request, was brought forward, and adopted.

4. From W. Storm, Esq., submitting extract of a letter to his address from Mr. James Pontet, of Bhaugulpore, requesting to be informed if the Society are prepared to incur the expense of keeping up a small nursery garden at Darjeeling, for acclimatising seeds for the plains. Referred to the Garden Committee.

5. From J. G. Bruce, Esq., Cawnpore, stating that the vegetables raised in his garden from acclimated seed have proved superior to that raised from imported seed. Mr. Bruce encloses notes from several residents at his station, all speaking highly of the quality of the vegetables reared in his garden.

(*Saturday, the* 19*th April,* 1851.)

W. G. Rose, Esq., Vice-President, in the chair.

The minutes of the last General Meeting were read and confirmed.

Elections.

As Corresponding Member.—Dr. D. J. Macgowan, of Ningpo.

As Ordinary Members.—Messrs. F. M. Lind, C.S.; Stewart Douglas; E. H. C. Monckton, C.S.; and Lt.-Col. J. Alexander, C.B.

Candidates for Election.

C. Bruce Skinner, Esq., Barrister at Law,—proposed by Mr. T. C. Morton, seconded by Mr. C. R. Prinsep.

Wm. Elliot Morton, Esq., Bengal Engineers,—proposed by Mr. Morton, seconded by Mr. Prinsep.

Capt. Geo. Scott (6th Light Cavalry), Deputy Pay Master, Benares,—proposed by Major W. M. Stewart, seconded by Mr. F. Gubbins.

A. D. Turnbull, Esq., Bengal Engineers,—proposed by Mr. A. Grote, seconded by Dr. Falconer.

Brigadier Colin Mackenzie (Madras Army), Commanding Ellichpore Division, H. H. the Nizam's Army,—proposed by Dr. Falconer, seconded by Dr. Huffnagle.

R. Dodd, Esq., Merchant, Calcutta,—proposed by Mr. W. G. Rose, seconded by Mr. W. Storm.

Lt.-Col. J. Mackenzie (8th Light Cavalry), Commandant 6th Irregular Cavalry, Sealkote,—proposed by Major R. Houghton, seconded by Mr. W. G. Rose.

J. Inglis, Esq., C.S., Deputy Commissioner, Punjaub,—proposed by Major Houghton, seconded by Mr. Rose.

D. Mackinlay, Esq., Merchant, Calcutta,—proposed by Mr. James Church, Senior, seconded by Mr. Grote.

W. McAdam Stewart, Esq., Merchant, Calcutta,—proposed by Mr. Church, seconded by Mr. Grote.

Henry Lushington, Esq., Junior, Civil Service, Agra,—proposed by the Rev. Dr. Carshore, seconded by Mr. Rose.

Baboo Womeschunder Ghose,—proposed by Baboo Peary Chund Mittra, seconded by Baboo Ram Gopal Ghose.

J. H. Fergusson, Esq., Merchant, Calcutta,—proposed by Mr. Church, seconded by Dr. Huffnagle.

Brigadier J. B. Hearsey, C.B., Commanding at Wuzeerabad,—proposed by Mr. Church, seconded by Mr. Storm.

Read a report from the Council in accordance with the resolution of the last General Meeting, referring to Mr. Hume's resignation of the office of Honorary Secretary.

The meeting upon receiving this report came unanimously to the following resolution :—

"That the Society, in accepting the tender of Mr. Hume's resignation of the office of Honorary Secretary, returns its cordial thanks for his valuable services during a period of eight years ; and desires to put on record the sense which it entertains of the unremitting zeal, ability, and attention, which Mr. Hume has on all occasions devoted to the business of the Society."

Read also the following recommendation of the Council:—

"The Council, in submitting the above, do not consider that it is within their province to recommend an appropriation of the funds of the Society for a more substantial acknowledgment of Mr. Hume's services, which they think might, with propriety, be carried out by a private subscription amongst the Members of the Society."

Proposed by Mr. Wale Byrne, seconded by Mr. Speede, and carried *nem. con.*:—

"That this meeting having heard the suggestion of the Council to the effect that a suitable acknowledgment of Mr. Hume's services might appropriately be made by means of a private subscription amongst the individual Members of the Society, cordially concurs in that suggestion, and expresses its readiness to carry out any object tending to mark the sense it entertains of the late Honorary Secretary's services."

Read the following recommendation from the Council in reference to the resolution passed at the last General Meeting, regarding the expediency or otherwise of filling up the vacancy consequent on Mr. Hume's retirement:—

"That it is inexpedient to fill up the vacancy in the office of Honorary Secretary caused by the resignation of Mr. Hume, and that the duties of the Secretariat can be adequately performed by appointing Mr. Blechynden as Secretary, without an increase of salary, the appointment involving but little increase of duty or responsibility, and by not filling up the vacancy in the office of Deputy Secretary caused by the appointment of Mr. Blechynden as Secretary."

Read the following additional recommendation of the Council in connection with the above:—

"That the revision of such drafts of correspondence as has hitherto been exercised by the Honorary Secretary, be delegated to a Sub-Committee, consisting of three Members of the Council, to be designated the Sub-Committee of Correspondence, any one of whom to approve of such drafts before the despatch of the letters."

The recommendations of the Council were unanimously adopted.

The recommendation of the Council, of which notice was given at the last General Meeting, proposing Col. Sage to fill a vacancy in the Council, was next brought forward, and unanimously adopted.

Horti-Floricultural Exhibitions.

The following reports of the judges respecting the exhibitions of flowers, vegetables, and fruits, held in the Auckland Circus, on the 1st of March and 11th of April, were submitted:—

Flower Show of 1st March.—"The judges have the pleasure to report, that though the collection of plants brought forward on this occasion, was rather less than at the second show of 1850, the number of competitors was greater than at any previous exhibition, the produce of upwards of 45 gardens having been submitted, to thirty of which prizes to the extent of Rs. 169, were awarded, as per annexed detailed list. In the list of novelties may be mentioned, *Salvia patens, Euphorbia variegata, Fuchsias,* an *Oxalis,* large rose-colored *Verbena, Campelia Zanonia, Aphelandra cristata, Nemophila aurita,* and *Heliophila araboides: Portulacas, Phloxes* and *Verbenas* of varied hues, *Antirrhinum, Pinks* and *Heart's-ease* were well represented. Of *Martynias, Campanulas, Calceolarias, Mimulus, Calendrinias, Rhodanthe Manglesii* and *Rudbeckias,* there were several examples; and a tolerably large assortment of the more common order of annuals, such as *Eutocas, Schizanthus, Nemophilas, Lobelias, Collinsias, Salpiglossis, sweet-peas, &c.* Among the few orchids that were submitted, were several well-grown specimens of *Dendrobium* and *Cœlogyne;* with several of the bulbous and tuberous tribe, namely, *Gladiolus, Anemone, Ranunculus, Oxalis,* a few lilies, &c. The number of visitors was greater than at any previous exhibition; it is calculated that upwards of two thousand persons were present."

Vegetable and Fruit Show of 1st March.—"Though the collection of vegetables was not equal to that submitted at the first show of the season, yet the judges are of opinion that there was altogether a very fair display. Among the *Brassica* tribe, the brocoli, red cabbage, and nolekole were conspicuous, and there were some good specimens of cauliflower and early York and sugar-loaf cabbage. Of coss-lettuce, endive, turnips, peas, early horn carrot and celery, several fair samples were exhibited, and, for the time of year, good turnips and long-radishes. Artichokes of good quality were well represented, though so early in the season, shewing that the culture of this fine vegetable is annually improving. There was a fair collection of herbs, also tomatoes and horse-radish. In the department of fruits, the pomegranates, sapotas and loquots took the lead, being well-grown and flavored: some tolerably good specimens of early pine-apples were also brought forward, and a few baskets of strawberries."

Flower Show of 11th April.—"The produce of twenty-five gardens were represented on this occasion, to eighteen of which prizes were awarded amounting to Rs. 92, as per list annexed. Several fine specimens of orchids were exhibited, namely, *Vanda Roxburghii, V. teres; V. species; Saccolabium affine; Dendrobium densiflorum; D. transparens, D. densiflorum pallidum, D. Paxtoni, D. formosum; Cymbidium aloifolium; Epidendrum crassifolium;* and *Pholidota imbricata.* In the list of novelties, were a few healthy plants of *Fuchsias, Gloxinias* of three species, (*rosea, cœrulea* and *Griffithii,*) a fine *Gesnera,* a *Tillandsia, Didiscus cœruleus, Stapelia Asterias,* and new kinds of *Lobelia, Petunea* and *Campanula*. Some very well-grown examples of *Jacquinea ruscifolia*, *Lemonia spectabilis*, *Echites suberecta*, and *Hoya* were brought forward, and a small assortment of bulbous plants. The collection of plants was altogether limited, as might be expected at this period of the year, and but few others than those enumerated above were considered deserving of notice."

Vegetable and Fruit Show of 11th April.—"Though as was to be anticipated, the collection of vegetables and fruits was smaller on this occasion than the last, it must nevertheless be considered an encouraging exhibition, if only proving how late in the season, vegetables which have heretofore been procurable only in the cold weather, can be retained. Of cabbages of several kinds, drumhead, sugar-loaf and red, there were several excellent specimens, as also of lettuce, carrot, turnip, beet and radish. The leeks were well-grown, but there is a room for improvement as respects blanching. Horse-radish is improving annually, but evidently requires yet deeper culture than is given. The asparagus shewed a decided improvement, but grown, probably, in too stiff a soil: while of artichokes the specimens exhibited were almost as fine as in Europe. The cucumbers, especially the white Nepal sort, were good. Tenasserim yam, plentiful and well-grown; Indian corn well represented and good, particularly for so early in the season: of gourds and pumpkins there was a fair collection. Among the fruits were peaches of good size and flavor, though so early in the season; also loquots and sapotas late in the season: a few strawberries and raspberries were submitted, and green soursop, a month before the period when it is in perfection. Some good specimens of bêl, plantain, Malacca jamrool and melons of sorts were likewise exhibited. Considering the heat of the weather, the attendance was great, there being upwards of 500 visitors. The prizes amounting to Rs. 103, as per detailed list, were distributed by Rajah Pertapchunder Sing, V. P."

In connection with the above, the following recommendation from the Council was read:—

"The application of the Society for the Band of the Royal Irish for the March Show not having been complied with, a request was made to Brigadier Frith for the services of the Artillery Band, which was immediately assented to; and the Council recommend that the best thanks of the Society be given to Brigadier Frith, and the Band Committee, for their ready compliance on that occasion as well as that on the previous show in January, and at the last exhibition of the season."

The recommendation of the Council was unanimously adopted. It was further resolved that the best acknowledgments of the Society be given to Col. Warren, Capt. Bazeley, and Capt. Fraser, for their kind acquiescence in all the wishes of the Society, in respect to the arrangements, which have contributed so greatly to the efficiency of these shows.

Presentations.

1. Journal of the Indian Archipelago, for February and March 1851. *Presented by the Editor.*

2. Copies of the same. *Presented by the Government of Bengal.*

3. Journal of the Asiatic Society of Bengal, No. 7 of 1850. *Presented by the Society.*

4. On the Poppy cultivation and the Benares Opium Agency, by Dr. Eatwell. *Presented by the Government of Bengal.*

5. Stephenson's Treatise on the manufacture of Saltpetre. *Presented by J. W. Roberts, Esq.*

6. Philosophical Almanac, in Chinese, by Dr. D. J. Macgowan. *Presented by the Author.*

7. List of articles contributed from Bengal to the Exhibition of 1851. *Presented by the Government of Bengal.*

8. Two plants of Vanilla, one of the "Potato creeper," and fruit of *Sechium edile. Presented by J. G. Waller, Esq.*

9. A small quantity of Russian hemp seed. *Presented by W. Thomson, Esq.*

10. A yellow rose-plant, and a white tea-scented rose. *Presented by Geo. Bartlett, Esq.*

11. One hundred and eighty-two Sylhet orange trees. *Presented by R. W. G. Frith, Esq.*

12. A quantity of Cis-Alpine strawberry plants. *Presented by W. Earle, Esq.*

13. Specimens of American maize of four kinds, raised in the Barrackpore Park, from seed imported by the Society. *Presented by Mr. Dougherty.*

The seed was sown in November; the produce is fully equal to the original stock.

14. Specimens of a description of bean in pod, raised in his garden at Chittagong, from seed which Capt. Marquard brought from Shanghae. *Presented by A. Sconce, Esq.*

Mr. Sconce states that this is an excellent bean. "The green pods, pulled when tender, and about eight or nine inches long, are superior to French bean, possessing more flavor, more soft and pleasant to eat. Also the ripe beans are excellent, when eaten like the Lima bean. I planted the bean sometime in August last; again later, in November, the first grew luxuriantly, the latter continued short and stunted. Obviously the rains is the best time to plant them; though what month in the rains is best, is still open to experiment. The seeds sown in August continued to bear for several months; the plant grows as a bush, its branches lengthening like creepers."

Dr. Falconer, to whom the above pods were referred, states that they belong to *Canavalia gladiata,* and he adds that a variety grows in Sylhet with pods three feet long.

15. Specimens of fibrous materials from Upper Assam, prepared in various ways, namely, the "Dom Rheea," "Bon or Jungle Rheea," and "Horoo Surat," or stinging nettle of Assam. *Presented by Major S. F. Hannay.*

16. Specimens of three kinds of fibre and of rope made therefrom. *Presented by Captain A. Thompson.*

The following is extract of Capt. Thompson's communication respecting the above specimens :—

"No. 1 is from the fibre of the "Belatee Ananas," or bastard pine-apple. I am not sanguine as to its ever coming into general use, from the difficulty of procuring it in sufficient quantities, as well as the inferior strength of the fibre.

No. 2 is a dressed sample of the *Cannabis sativa* from Jubbulpore, and No. 3 a piece of the rope made of it, part of the rigging made for some ships that were dismantled in the Bay of Bengal last year, and which has proved equal to any Europe-made rope.

No. 4 is a dressed sample of the fibre of the *Æschynomene cannabina*, or "Dunsha" of Bengal; and No 5, a piece of rope made of it. This rope has been used in various ways for nearly two years, and from various reports upon it, (copies of which I enclose), I think it likely to come into extensive use. Mr. G. W. Grose, of Howrah, has, with myself, been engaged experimenting on the best mode of separating, cleaning, and preparing the fibre, and I am in hopes that we will succeed in still further improving it with the aid of steam machinery."

17. A muster of wool. *Presented by A. Sconce, Esq.*

Mr. Sconce mentions that this wool has been cut from sheep which Capt. Marquard brought to Chittagong from Shanghae. The sheep are large-bodied animals, tall and long.

A report from Mr. James Cowell, to whom this fleece had been referred, was submitted.

18. A quantity of seed of the common "Junglee Badam" of the South of India,— *Sterculia fœtida.* Forwarded by Mr. Sconce, on behalf of Mr. J. C. Bruce, of Chittagong, with the view of ascertaining the name of the tree yielding it, and whether it can be turned to any use.

19. Specimens of oil (boiled and unboiled) expressed from the seed of *Sterculia fœtida. Presented by W. Haworth, Esq.*

20. A maund of arrow-root, grown and manufactured in the Society's Garden.

Mr. Speede, to whom a muster of this powder was submitted, reports very favorably of it, stating he has seldom seen any specimen so satisfactory. "The fecula is bright, and smooth under the finger. I have tested it as an article for infant's food, a tea-spoon full of the powder with a cup full of boiling water, giving a clear strengthening food. I have tried also five spoons-full of the powder to a cupfull of boiling water, which gave a fine jelly, similar to blanc-mange. It is moreover, clean, and well manufactured in every respect." (Portions of this arrow-root are available to members.)

Communications on various subjects.

1. From Major S. F. Hannay, dated Deebrooghur, February, a long and interesting communication on the *Rheeas* or nettle grasses and other textile fibres of Assam.

Ordered for publication in the Journal now in the press.

2. From Dr. Falconer, reporting on some pods forwarded for examination by Dr. MacGowan of Ningpo; as yielding a kind of vegetable soap, and a cosmetic, supposed by him to belong to a species of *Sapindus.*

Dr. Falconer states, that "it belongs to a leguminous plant of the *Cæsalpinia* tribe, and closely allied to the genus of that name. It has no relation whatever to *Sapindus* which yields the soap-nuts of India ("Reetha") and other countries"

3. From the Hon'ble J. C. Erskine, Nepal, and H. H. Bell, Esq., Agra, acknowledging the receipt of the New Grenada seed-paddy, and promising to communicate the result of sowings in due course.

4. From Dr. Falconer, stating that the leaves forwarded by Major Jenkins from Assam, and referred to at the last General Meeting, belong to *Janipha Manihot.* Dr. Falconer also reports favorably on the musters of tapioca, prepared from the above plant, and forwarded by Major Hannay.

5. From F. W. Channing, Esq., Superintendent Cotton Experiments, Pursghur, Belgaum Collectorate, intimating his intention of sending a cotton-cleaning machine in all December next, to compete for the prize of Rs. 5,000.

6. From E. G. Dunbar, Esq., requesting to be informed if he can be supplied with a quantity of Sea Island cotton seed for trial on the east coast of Ceylon.

Ordered,—That Mr. Dunbar's name be placed on the list of applicants for cotton seed, expected in June or July next from North America.

7. From Dr. Falconer, mentioning that none of the *Victoria Regia* seed of Dr. Wallich's despatch from Sion house have yet germinated in the Botanic Garden, nor have those which were received from Sir W. Hooker from Kew, some months before, come up as yet. Dr. Falconer adds,—"but one plant has been raised from some seed received by Mr. Scott from Chatsworth by the steamer of last month. One seed arrived in a sprouting state, it has thriven well, and we expect to be able to plant the young Victoria out soon."

The Gardener's monthly report was likewise submitted in allusion to the plants and seeds referred to among the presentations, and to a few others previously received.

Notice of Motion for the next General Meeting.

Proposed by Baboo P. C. Mittra, seconded by Dr. Falconer,—

That section 9 of chapter X. of the Bye-Laws be altered as follows:—

"No person shall hold at the same time more than one of the following offices, viz.:—President, Vice-President, or Secretary."

(*Saturday, the* 10*th May,* 1851.)

The Hon'ble Sir Lawrence Peel, President, in the chair.

The minutes of the last General Meeting were read and confirmed.

Elections.

Messrs. C. Bruce Skinner; J. Inglis, C.S.; D. Mackinlay; W. McAdam Stewart; Lieut. W. Elliot Morton; Captain Geo. Scott; Lieutenant A. D. Turnbull; Brigadier Colin Mackenzie; Lieut.-Colonel J. Mackenzie; Messrs. R. Dodd; Henry Lushington, Junior, C.S.; J. H. Fergusson; Baboo Womeschunder Ghose and Brigadier J. B. Hearsey, C.B.

Proposals.

Wm. Ritchie, Esq., Barrister at Law,—proposed by Mr. Arthur Grote, seconded by Dr. Falconer.

R. E. Cunliffe, Esq., C.S., Mymensing,—proposed by Mr. Grote, seconded by Dr. Falconer.

J. H. Prinsep, Esq., C.S., Assistant Commissioner, Punjaub,—proposed by Major R. Houghton, seconded by Lieut.-Col. W. Sage.

Lieut. J. Harley Maxwell, Bengal Engineers,—proposed by Mr. James Church, Senior, seconded by Mr. Stewart Douglas.

J. Scott Elliot, Esq., firm of Messrs. Gisborne and Co.,—proposed by Mr. Church, seconded by Mr. Douglas.

A. W. Begbie, Esq., C.S., Agra,—proposed by Mr. M. R. Gubbins, seconded by Mr. W. Muir.

Presentations.

1. A complete set (Vols. 1 to 16) of Paxton's Magazine of Botany. *Presented by Sir Lawrence Peel.*

On the motion of Dr. Falconer, seconded by Mr. James Church, Senior, it was unanimously resolved, that the best thanks of the Society be given to Sir L. Peel for this handsome donation to its Library.

2. Journal of the Asiatic Society of Bengal, No. 1 of 1851. *Presented by the Society.*

3. A few more specimens of the fibrous substances of Assam plants, viz. of the "Bedolee lotah," in various stages of preparation, and of the "Lugeo" (*thinia scandens*). *Presented by Major S. F. Hannay.*

In forwarding the above, Major Jenkins observes—"the fibre from the 'Bedolee lotah' looks a beautiful substance, and I should hope something might be made of it, especially as Major Hannay writes—'it is one of the commonest plants in the jungles, and can be had in any quantity.' I do not know the plant by Major H.'s name, neither does Mr. Simons; but I may find it out through the Assamese. Major Hannay adds—'it is known to the Nepalese as the 'Beree,' and the juice of the fruit is used by them as a strengthener of the gums and teeth."

4. A few samples of some of the productions of the Tenasserim Provinces, consisting of fibrous specimens, gum-resins, &c. *Presented by the Central Committee of Art and Industry for Bengal.*

5. A small supply of seed of the "Nahor" (*Mesua ferrea*) of Assam, and a specimen of oil expressed therefrom. *Presented by C. A. Cantor, Esq.*

Mr. Cantor states that this oil has not been boiled, nor filtered. 24 seers of the seed yielded 13 seers of the kernel, 6¼ seers of oil, and 4¾ seers of cake.

The motion of which notice was given at the last General Meeting, by Baboo Peary Chand Mittra, seconded by Dr. Falconer, to the effect that Section 9 of Chapter X. of the Bye-Laws be altered as follows:—

"No person shall hold at the same time more than one of the following offices, viz. President, Vice-President, or Secretary," was brought forward and carried.

Notice of Motion for the next General Meeting.

Proposed by the Hon'ble Sir Lawrence Peel:—

"That this Society respectfully submit to the Government of India that it would tend to promote Horticulture, if the Hon'ble the East India Company were to cease distributing plants gratuitously from their Garden, to persons resident in India; and that it would be advisable not to distribute such plants, to such persons, unless the same were to be paid for; and at such prices as would enable general cultivators for profit to undersell the public Garden."

The Gardener's monthly report was read. Mr. McMurray alludes to the present condition of the American fruit trees which were brought out in ice in March 1850. "Referring to the apple trees, I may mention, that the whole at present in pots, and those that were planted out in July last, are in a vigorous healthy condition: on comparing the trees now in pots, with those that are planted out, I find the latter have made the more healthy growth. Since my report in November last, two of the three pear-trees that were planted out, and then reported in good health, have since died; one of the two pear-trees in pots is also dead. The whole of the plum-trees are in a healthy condition, the peach-trees are growing vigorously. One of the two cherry-trees in pots is dead. Only one of the currant plants is now alive, and that is in a sickly condition."

The Gardener alludes further to several late contributions to the garden, including 500 roots of the Jerusalem artichoke from Mr. Dougherty of the Barrackpore Park; and adds, in conclusion, that the seeds of *Victoria regia* which were received from Dr. Wallich in February last, have not yet germinated.

It was agreed that this circumstance be communicated to Dr. Wallich, and his assistance requested for the further promised supply.

Communications on various subjects.

1. From Major R. Houghton, giving a few details respecting his horticultural operations at Sealkote. Major Houghton alludes to the superiority of American vegetable seeds for Upper India; notwithstanding the heat and exposure to which they were subjected in the long journey from Calcutta, not one single kind failed to germinate, all have attained the greatest perfection. Nearly all the Van Dieman's Land vegetable seed, received last year from the Society, failed, but the few kinds that did germinate, gave excellent produce, especially the turnips, the like of which, in size and quality, Major Houghton has not seen in any part of the world.

2. From Lieut.-Col. Sage, accepting, with pleasure, the seat in the Council to which he was nominated at the last General Meeting, and intimating his readiness, so soon as a little leisure permits, to resume an active participation in the affairs of the Society.

3. From G. G. Mercer, Esq., Eta, giving the result of sowings of various descriptions of seeds received from the Society during 1850.

4. From Mr. McMurray, submitting a tabular statement, shewing the result of his pea sowings in the Society's Garden during the season 1850-51, with the following few particulars respecting the preparation of the ground and subsequent treatment of the peas:—

"In the month of October I had the ground ploughed four times. Lines were then marked off twelve feet apart with a *kodaly;* a small trench was made, nine inches broad and four inches deep; in the bottom of each trench was put two inches deep of manure, which was well mixed with one-half of the soil that had been moved in forming the trench. The remaining half of the soil was placed on the top, a small ridge being thus formed, on the top of which a drill, two and a half inches deep, was opened, and the seed sown and covered; as the plants came up they received as usual moulding and staking when required. No water was given during the whole season; the ground between the lines was kept clear of weeds, and to prevent baking frequent hoeings were necessary."

The plants remained in a healthy state throughout, and yielded six maunds of well-ripened seed, which is reserved for distribution in due season.

5. From Mr. D. Landreth, Seedsman of Philadelphia, advising the despatch of six kinds of grass seed,—namely, the "Kentucky blue grass," "Ti-

mothy," "Herds, or red top," "sweet-scented vernal grass," "Rye grass" and "green grass." (This consignment has arrived, and the seeds are available to members.)

Letters were also read from Dr. Campbell, at Darjeeling; Mr. T. M. Robinson, at Chota Nagpore; Major Jenkins, Gowhatty; and Mr. Merrick Shawe, at Sylhet, regarding the New Grenada seed-paddy received from Messrs. Gillanders, Arbuthnot and Co., and alluded to in the March proceedings. Dr. Campbell writes :—"The New Grenada seed-paddy shall have a careful trial in this neighbourhood. If it yields two or three crops per annum, it will be an invaluable acquisition; but as 19 per cent of the rice grown in those mountains does not require irrigation, it offers nothing new in this respect." Mr. Robinson remarks :—"Immediately the paddy reached me I planted out about one-fourth of it in the manner described in the printed enclosure of your letter, and will let you know the result. The soil of this country is exactly adapted to the plants, but I fear the temperature of this season will not suit it, the thermometer ranging from 80° to 100° in the shade; and also the rains will have set in before the plant is full grown. The cold season I think would suit it better, provided it would not be injured by the low temperature of the nights here 32° to 38.° I am shortly going to visit an elevated table-land in this country, called the Mayar Paat, 4500 feet above the sea, and there, I think, it may answer and prove of great value, as in the hottest weather the temperature will not exceed that described as suiting the plant. The same difficulty, however, about the rains may apply there, if the seed is sown now; and I think it ought to be put into the ground early in March." Major Jenkins observes :—"I will have the paddy sown immediately; it looks very much like our hill rices, but I never heard of any of our rices giving a second crop." Mr. Shawe,—"The paddy duly reached me. I regret I did not receive it a month or six weeks earlier: half the quantity was sown immediately on its receipt, but I am sorry to say to no purpose, as the rain fell in torrents, and we have had wet weather here ever since" (17th April).

Mrs. Macleod submitted from her garden a fine plant of *Cyrtopera flava* in full flower; cut specimens of *Saccolabiun guttatum*, healthy plants of double zinnia in flower, and a *Hydrangea*, also in blossom.

Two boxes and two teapoys, manufactured from the pieces of teak from Bancoorah which were lately presented to the Society by Mr. T. B. Mactier, were also brought to the notice of the meeting; the wood was much admired for the beauty of its grain.

(Saturday, the 14th June, 1851.)

The Hon'ble Sir Lawrence Peel, President, in the chair.

The minutes of the last Monthly Meeting were read and confirmed.

Elections.

Messrs. W. Ritchie; R. E. Cunliffe, C.S.; J. H. Prinsep, C.S.; Lieut. J. Harley Maxwell; Messrs. J. Scott Elliott, and A. W. Begbie, C.S.

Proposals.

H. C. Hamilton, Esq., C.S., Tumlook,—proposed by Mr. W. H. Elliott, seconded by Mr. W. G. Rose.

J. Maitland, Esq., M.D., 8th Nizam's Infantry,—proposed by Captain Meadows Taylor, seconded by Dr. Falconer.

Captain J. B. Thelwall, H. M. 24th Regiment of Foot,—proposed by Major Richmond Houghton, seconded by Lieut.-Col. W. Sage.

Captain D. Ross, Commissioner, Leia Division, Punjaub,—proposed by Capt. G. E. Hollings, seconded by Capt. Hugh Fraser.

A. H. Blechynden, Esq., Calcutta,—proposed by Mr. W. G. Rose, seconded by Mr. James Church, Senior.

Captain Robert Gill, 44th Regiment Madras N. I.,—proposed by Capt. W. O'Brien, seconded by Mr. Willis Earle.

F. A. M. Nicol, Esq., Dhoba,—proposed by Mr. Rose, seconded by Mr. Willis Earle.

Thomas Savi, Esq., Kishnaghur,—proposed by Mr. George Barton, seconded by Mr. Church.

Owen Moses, Esq., Calcutta,—proposed by Mr. Rose, seconded by Mr. R. Molloy.

Lieut. S. H. J. Davies, 51st Regt. N. I., Jullundur,—proposed by Mr. J. H. Fergusson, seconded by Mr. James Church.

Captain W. Wyld, 4th Lancers,—proposed by Major Houghton, seconded by Col. Sage.

Wm. Daunt, Esq., Tirhoot,—proposed by Mr. G. N. Wyatt, seconded by Mr. Earle.

Geo. Higgins, Esq., Solicitor, Supreme Court,—proposed by Sir Arthur Buller, seconded by Mr. Geo. Taylor.

Lieut. G. E. Higgins, 3d Regiment N. I., Jhelum,—proposed by Major C. Hogge, seconded by Sir L. Peel.

Lieut. G. C. Hankin, Adjutant 6th Irregular Cavalry, Sealkote,—proposed by Major R. Houghton, seconded by Col. Sage.

Edward de Lautour, Esq., C.S., Arrah,—proposed by Mr. Arthur Grote, seconded by Dr. Falconer.

Major H. O. Mayne, Nizam's Army,—proposed by Mr. J. H. Cooper, seconded by Mr. W. G. Rose.

Presentations.

1. Journal of the Indian Archipelago for April 1851. *Presented by the Editor.*

2. A copy of the same work, also for April. *Presented by the Government of Bengal.*

3. Journal of the Asiatic Society of Bengal, for February 1851. *Presented by the Society.*

4. Eight seeds of *Victoria regia* from Kew, received by the June steamer. *Presented by Dr. Falconer.*

5. One hundred and thirty-six Orange seedlings of several kinds from Cherra Poonjee. *Presented by R. W. G. Frith, Esq.*

6. Samples of tobacco and cotton from Chota Nagpore. *Presented by H. Piddington, Esq.*, on behalf of Captain Houghton, Assistant Agent, G. G., S. W. Frontier.

7. Three pieces of colored Eri silk from Major Hannay. *Forwarded for exhibition by Major Jenkins.*

Major Jenkins observes, that Major Hannay's object in submitting these specimens is merely to show what colors can be given to them with native dyes. Most of the Eri *chuddurs* are worn quite plain, but some of the hill races have them colored.

8. Seed of *Medinilla Walkerii*, a very beautiful climber. *Presented by G. H. Thwaites, Esq., Superintendent Royal Botanic Garden, Ceylon.*

The following motion, of which notice was given by Sir Lawrence Peel at the last General Meeting, was read :—

"That this Society respectfully submit to the Government of India, that it would tend to promote horticulture, if the Hon'ble the East India Company were to cease distributing plants gratuitously from their Garden, to persons resident in India ; and that it would be advisable not to distribute such plants, to such persons, unless the same were to be paid for ; and at such prices as would enable general cultivators for profit to undersell the public Garden."

The motion was seconded by Sir Arthur Buller.

A minute of objections entertained by Mr. Earle to the above motion, having been placed in the hands of the Honorable Proposer, on the 12th June, was now orally replied to by him at some length ; and Sir Lawrence concluded his observations by remarking, that to prevent a misconception which had arisen on certain points, he had thought fit to change the language of his motion, without altering the substance, as follows :—

"1st. That a distribution gratis by the East India Company of common plants, which the general cultivators for profit are now able to supply at moderate prices, tends to check private enterprise and the progress of cultivation.

2nd. That if there be any trust or condition under which such gratis distribution now takes place, this Society does not invite a breach of it.

3rd. That if there be no such trust or condition then this Society respectfully suggests to the Government of India, that a change in their distribution of plants is expedient, so that private persons resident in British India shall not be able to obtain from the Hon'ble Company's Garden common plants, such as are procurable from the common growers, except on the terms of paying for them at prices fixed above the ordinary market price ; so that the Government may not compete as sellers with the private growers.

4th. That the last resolution is not meant to extend to any private applicant for plants who may be able to show that he is too poor to purchase the plants for which he applies, and that the application is his first application for those plants for that garden or ground which he is then cultivating.

5th. That it be referred to the Council to inquire into the existence of any such trust or condition as that supposed by Mr. Earle.

6th. That if no such trust or condition appear to exist, then that the above resolutions be forwarded to the Government by the Society for their consideration."

Read the minute of Mr. Earle above referred to.

Read a letter from Mr. W. Storm, objecting to the terms of the above motion.

A discussion arose whether the motion, as altered, could be proposed by the mover without a fresh notice. No decision was come to on the point as the re-worded resolutions were proposed by Sir James Colvile, seconded by Mr. C. Bruce Skinner, as an amendment on the motion ; and being put to the vote, were carried.

Proposed Removal of the Society's Garden.

Read the following Report of the Sub-Committee of the Council, appointed at a Monthly Meeting of the Council, held on the 6th May, 1851:—

In accordance with the Resolution passed at the last Monthly Meeting of the Council,* the Committee beg to report, that having duly considered the subject referred to them, they are of opinion, that it is in every respect desirable to remove the Garden to the Calcutta side of the river.

2nd. Your Committee are further of opinion, that there are no standing fruit trees in the garden that might not either be removed to, or replaced in a Garden on the Calcutta side, and that arrangements could easily be made to obviate inconvenience, either to the members of the Society, or to the public, from the discontinuance of the issue of the grafts that are now produced in the Garden.

3rd. Your Committee conceive that the question of the ability to raise the

* "That a Committee be appointed to report on the advisability, or otherwise of having the Society's Garden on this side the River, and that the following gentlemen form such Committee,—Sir L. Peel, Mr. Rose, Mr. Church, Dr. Falconer and the Rajah Pertap Chunder Sing."

funds necessary for the proposed change of locality, either by an application of the accumulated funds of the Society in the whole, or in part, or by a subscription, is not delegated to them; but they think that considerable funds for carrying out the object, might be raised by appealing to the liberality of individuals by subscription.

4th. The minutes of the members of your Committee are appended to this report.

(Signed) LAWRENCE PEEL.
„ J. CHURCH.
„ H. FALCONER.
CALCUTTA: *May* 31*st*, 1851. „ PERTAP CHUNDER SING.

Read the following extract from the proceedings of the Council at a monthly meeting held on the 10th June:—

"That the Report be adopted; and that it be recommended to the next General Meeting that the report, with the several minutes of the members, be printed and circulated among the Mofussil subscribers. Resolved, further, that it is the opinion of the Council that the amount required for the purchase of a piece of ground in an eligible site, and for the formation of a new Garden, would be from Rs. 35,000 to Rs. 40,000; that the sum of Rs. 15,000 might be made applicable for the special purpose from the vested Fund of the Society, now amounting to Rs. 22,000, and the residue raised by subscriptions; a reserve fund of Rs. 7,000 being deemed adequate for the general objects of the Society."

Read a letter from Mr. W. Storm dissenting from the proposal for the removal of the Society's Garden from its present site.

Resolved.—That the first part of the recommendation of the Council be adopted, and that the consideration of the remaining portion be reserved until the general question comes again before the Society.

Communications on various subjects.

1. From H. Cope, Esq., Secretary to the Agricultural and Horticultural Society of the Punjaub, enclosing a copy of resolutions passed at the preliminary Meeting of the Society, and requesting the aid of this Society.

Resolved.—That this Society expresses its general concurrence in the views of the newly established Agricultural and Horticultural Society of the Punjaub, and its desire to promote them to the best of its power. That a complete copy of the publications of this Society be sent to the Punjaub Institution, with the expression of its readiness to meet their requests, if put in a definite form.

2. From George Loch, Esq., Secretary Branch Agricultural and Horticultural Society, Bhaugulpore, submitting copy of a report of a meeting of their subscribers, held on the 6th of May.

3. From Major W. McMurdo, President to the Simla Agricultural Association, forwarding a copy of their prospectus, and report of their first exhibition, and expressing his hope that the Association may meet with the cordial support of the Agricultural and Horticultural Society of India. Agreed that a supply of such descriptions of seeds as may be available and suitable to the climate of Simla, be placed at their disposal.

4. From G. H. Thwaites, Esq., Superintendent Royal Botanic Garden, Ceylon, acknowledging receipt of an assortment of seeds of Himalayan Coniferæ, several of which have germinated readily.

5. From Captain G. E. Hollings, Leia, in the Punjaub, giving the result of his sowings of various sorts of seeds received last year from the Society. Captain Hollings acknowledges the receipt of the new Granada seed-paddy, and adds,—"The Society will be pleased to hear that the crops of oats sown in different parts of the Sind Sagur Doab have turned out remarkably well, and it may be said that both oats and lucerne have been fairly introduced."

6. From Captain F. C. Burnett, Artillery, respecting the soil and climate of Peshawur.

7. From Lieutenant-Colonel P. T. Cautley, Mussooree, acknowledging the New Granada seed-paddy, and stating in what manner he has distributed it, with the view of giving effect to the Society's wish for a fair experiment.

The Gardener's report, respecting the plants and seeds received into the Garden during the past month, was placed on the table; as also a statement of his attempts at raising melons and cucumbers from English seed presented by Sir L. Peel and Mr. Earle: all of which have proved unsuccessful from the effects of the climate and the ravages of insects. Mr. McMurray submits a plan of a melon frame, prepared by Mr. Scott of the Botanic Garden, which he thinks would, in future, obviate the difficulties he has had to contend against during the past season. Referred to the Council.

(Saturday, the 12th July, 1851.*)*

The Hon'ble J. E. D. Bethune, Vice-President, in the chair.

The proceedings of the last General Meeting were read: on the motion for their confirmation, Mr. Earle took an objection to certain Resolutions, and a discussion thereupon arising whether the Resolutions of one meeting required confirmation at another, reference having been made to the proceedings of 30th March, 1850, it was unanimously *Resolved,* that the question of the confirmation of the minutes of the last meeting be postponed until the next meeting.

Elections.

Dr. John Maitland; Captain J. B. Thelwall; Captain D. Ross; Captain Robert Gill; Messrs. H. C. Hamilton, C.S.; A. H. Blechynden; F. A. M. Nicol; Thomas Savi; Owen Moses; W. Daunt; George Higgins; Edward de Lautour, C.S.; Lieut. S. H. J. Davies; Captain W. Wyld; Lieut. G. E. Higgins; Lieut. G. C. Hankin, and Major H. O Mayne.

Proposals.

Lieut.-Col. J. T. Lane, C.B., Commanding Artillery, Wuzeerabad,—proposed by Major R. Houghton, seconded by Lieut.-Col. W. Sage.

Capt W. H. Nicholetts, Commanding Oude Local Infantry,—proposed by Dr. A. Greig, seconded by Mr. Willis Earle.

Baboo Rajendralall Mittra, Librarian Asiatic Society,—proposed by Mr. E. Blyth, seconded by Baboo Peary Chand Mittra.

Peter S. Lumsden, Esq. (60th N. I.) Officiating Deputy Assistant Quarter-Master General, Peshawur,—proposed by Dr. Falconer, seconded by Mr. A. Grote.

Lieut. J. DeCourcy Sinclair, (Madras Artillery) Commandant Artillery, United Malwa Contingent,—proposed by Dr. George Tranter, seconded by Mr. W. G. Rose.

S. G. Wyatt, Esq., office of Accounts of the Treasury, Calcutta,—proposed by Mr. Macleod Wylie, seconded by Mr. Wale Byrne.

W. H. J. Wood, Esq., Agra Bank, Calcutta,—proposed by Mr. W. G. Rose, seconded by Mr. R. Molloy.

G. Thiault, Esq., Calcutta,—proposed by Mr. Rose, seconded by Mr. W. Storm.

C. A. Cantor, Esq , Merchant, Calcutta,—proposed by Dr. Falconer, seconded by Mr Rose.

Lieut. Monck Mason, Political Agent, Kerowly,—proposed by Mr. Grote, seconded by Mr. Earle.

H. C. Tucker, Esq., Secretary for the time being, Local Committee, Allahabad,—proposed by Baboo Ram Gopal Ghose, seconded by Mr. Grote.

James Allan, Esq., M.D., Civil Surgeon, Bhaugulpore,—proposed by Dr. Huffnagle, seconded by Mr. James Hume.

Mr. Robert Scott, Head Gardener of the H. C. Botanic Garden,—proposed (on the recommendation of the Council) as an Associate Member, by Dr. Falconer, seconded by Mr. Grote.

Presentations.

1. Eight copies of "Leon's Art of Manufacturing and Refining Sugar." *Presented by the Government of Bengal,* for distribution amongst parties interested in the manufacture of sugar.

The names of six gentlemen were submitted by the Council, to whom copies of the above work might be given, as interested in the subjects on which it treats. Agreed that these books be so distributed.

2. Annales des Sciences Physiques et Naturelles, d'Agriculture et d'Industre de Lyon, Vols. 1 and 2, second series—1849-50. *Presented by the National Society of Agriculture*, &c. of Lyon.

3. Journal of the Asiatic Society of Bengal, for March 1851. *Presented by the Society.*

4. Journal of the Indian Archipelago, for May 1851. *Presented by the Editor.*

5. A small assortment of acclimated vegetable and flower seeds, raised in his garden at Cutwa. *Presented by George Hewett, Esq.*

6. Thirteen vanilla plants and two seeds of *Colvillea racemosa*. *Presented by Dr. Mouat, on behalf of M. Bojer of Mauritius.*

7. A few seeds of the "Doorian," *(Durio zibethinus)*. *Presented by R. Dodd, Esq.*

8. A small quantity of Assam Tea seed. *Presented by Dr. K. M. Scott.*

9. A few seeds of the China radish, received from Mr. Branch Pilot Ransom. *Presented by W. Earle, Esq.*

Mr Earle remarks :—"It is said to be an excellent radish, not stringy, sweet, juicy, and of a pleasant flavor. It is described as growing with a root, like that of a carrot reversed, the thicker end forming the lower portion,—the thinner uniting with the stem and leaves."

10. Specimens of fibre and rope made from the "common aloe," by Mr. Blackburn, junior, of the Home Correspondence Department, Agra. Forwarded by the Governor, N.W.P., together with a memorandum on the subject drawn up by Mr. W. J. Blackburn, of the Judicial and Revenue Department, N.W.P.

Dr. Falconer, to whom the above specimens were referred, observes,—that "the plant is not an aloe, but, so far as the specimens will admit of determination, *Agave Cantula*, which is now common in the N. W. Provinces. When at Saharunpore, I used to extract the fibre which, untwisted, was found very useful for bast in binding grafts from its lying close and even. The fibre is coarse and harsh, making an inferior kind of rope."

Mr. Blackburn's memorandum was referred to the Committee of Papers.

Notice of Motions.

I. Proposed by Mr. Earle, seconded by Baboo Pearychand Mittra :— "That in future the ordinary Monthly Meetings of the Society be held uniformly in the afternoon, of the second Saturday of each month as heretofore, and at the hours of 4 P.M. from October to March, and at 4½ P.M. from April to September, unless circumstances should render it expedient in the opinion of the Council or any General meeting, to alter the day of the next general meeting."

II. "That it be an instruction to the Secretary, in giving notice through the Calcutta newspapers of the Monthly Meetings, to state briefly in the same, heads of the principal subjects for discussion."

Communications on various subjects.

The following letters were likewise submitted:—

1. From the Secretary Board of Revenue, Lower Provinces, applying for a quantity of cotton seed of sorts for the purpose of being forwarded to Mr. Price, Superintendent of Government Cotton cultivation in Assam.

It was agreed, on the recommendation of the Council, that a portion of each description of cotton seed, daily expected from the United States, be transferred to the Board of Revenue for trial in Assam.

2. From D. F. McLeod, Esq., Dharmsala in the Punjab, applying for seeds of sorts. Mr. McLeod, also observes:—

"The small packet of rice, (New Granada) received from you a short time ago, is, I trust, likely to receive a fair trial in the Kangara district, which is an eminently rice-growing one, having rice cultivation at all elevations, probably from 2,000 or 2,500 feet above the sea to 6,000 or 7,000 at least; in some parts irrigated, in others not so. I have accordingly had it made over to Mr. George Barnes, the Deputy Commissioner, who has had it distributed in the locality he has thought most suitable, I believe, in the Nurpur Purgunnahs, and I hope to be able to supply you hereafter with a report on its results.

"Maize or Indian corn is another article of which any varieties you can send us will always be acceptable here. But I do not think you should send us any more cotton; there is some cotton, of a rather superior quality, sown along the range which bounds the Jaswun Dun; and the large town of Rahon, in Jullundhur, has long been celebrated for very superior cloths made from it. But the crop is not productive. Large quantities of cotton are imported, even for domestic use, and I am convinced that the cold here is too severe, and the frosts set in too early, to admit of the Punjab ever being a really cotton-bearing country."

3. From W. Earle, Esq., suggesting that an experimental assortment of the best kinds of vegetable seeds be procured from China for distribution over various parts of India.

Agreed;—and that the aid of Dr. Macgowan be solicited on the occasion.

4. From Dr. George Tranter, Mehidpore, in Malwa, respecting the result of his sowings of seeds, received last year from the Society:—

"You will be glad to know the seeds received from the Society have turned out most excellent. All Europe vegetables succeed well in Malwa, and last February I sent to the Resident at Indore three artichokes (from the

Society's American seed) the largest of which measured the almost incredible size of twenty-seven inches in circumference. The flavor too was excellent. Cauliflower, York and Savoy cabbages, lettuce, onions, carrots, radishes, cucumbers, peas and beans, celery, water-cress, all grow well; and it says not a little for our climate that we can have peas eight months in the year."

5. From A. Sconce, Esq., suggesting that the Society obtain some onion seed from Bombay, as neither the Cape nor American germinate freely.

Agreed;—and that an application be made at the same time to the Agricultural Society of Bombay for 50 mangoe grafts, of the best description, to increase the stock in the Society's garden.

6. From M. Bojer, Mauritius, forwarding a list of plants which he is desirous of obtaining, and promising certain kinds in return.

Resolved, that Dr. Falconer's aid be requested to enable the Society to meet this application as fully as circumstances will admit.

7. From Capt. G. L. Cooper, Cawnpore, applying for vegetable and flower seeds for the public garden at that station.

Agreed on the recommendation of the Council, that the request be complied with for this season, with an intimation that the Society will be glad to obtain hereafter, at cost price, such seed from other countries, for the above and other public gardens, on due notice of their requirements being given.

8. From Monsr E. Malsant, Secretary to the National Society of Agriculture, &c. of Lyons, acknowledging the receipt of Vols. 1 to 7 of the Journal of this Society, and returning thanks for the same.

9. From Mr. James Carter, Seedsman, London, acknowledging receipt of the Society's order for flower seeds, and intimating his intention of transmitting the same by the August steamer.

10. From Messrs. P. Lawson and Son, Seedsmen, Edinburgh, promising to give the Society's second experimental order for vegetable seeds their best attention; the same to be despatched by the September steamer.

The Gardener's Monthly Report was also submitted. Among other matters, Mr. McMurray notices that all his attempts to raise the American grasses have failed, with the exception of one kind—the "Herds' Grass," or "purple top" *(Agrostis alba)*, which has germinated 24 per cent. The Vanilla plants obtained from M. Bojer of Mauritius, are doing well. The acclimated China tea seed obtained from the Kemaon Nurseries have germinated freely, and all the seedlings are in healthy condition.

(Saturday, the 9th of August, 1851.)

The Hon'ble Sir Lawrence Peel, President, in the chair.

The proceedings of the last General Meeting having been read, a discussion arose in regard to the resolution passed on that occasion respecting the non-confirmation of minutes of the June Meeting; and it was eventually *Resolved,* that the question of the confirmation of the resolutions relative to the *gratis* distribution of plants from the H. C. Botanic Garden, stand adjourned until the Monthly General Meeting in October next, in order to give Mr. Earle, or any other gentleman, an opportunity of bringing the whole question again before the Society.

Elections

As Ordinary Members.—Lieut.-Col. J. T. Lane, C.B.; Capt. W. H. Nicholetts; Baboo Rajendralall Mittra; Lieut. Peter S. Lumsden; Lieut. J. DeCourcy Sinclair; Messrs. S. G. Wyatt, W. H. J. Wood, G. Thiault, C. A. Cantor, H. C. Tucker, Lieut. Monck Mason, and Dr. James Allan.

As an Associate Member.—Mr. Robert Scott, Head Gardener of the H. C. Botanic Garden, Calcutta.

Proposals

Lieut. George Weld, Fort Adjutant of Chunar,—proposed by Major W. M. Stewart, seconded by Capt. George Scott.

Henry E. [illegible], Esq., of Jorada Factory, Jessore,—proposed by Mr. Henry G. French, seconded by Mr. Jas. Watson.

Capt. T. Dalyell, (42nd L. I.) Deputy Pay Master, Cawnpore,—proposed by Lieut. John Eliot, seconded by the Secretary.

W. P. Sims, Esq., Calcutta,—proposed by Dr. [illegible] Chapman, seconded by Mr. W. Earle.

Captain Commandant James Ramsay, Commanding 4th Regt. Nizam's Infantry,—proposed by Brigadier James Johnstone, seconded by the Secretary.

C. R. Francis, Esq., M.B., Assistant Surgeon, Banda,—proposed by Mr. Hugh Sandeman, C.S., seconded by Capt. G. L. Cooper.

H. J. Lee, Esq., of the Bank of Bengal,—proposed by Mr. W. G. Rose, seconded by Mr. A. H. Blechynden.

Major E. J. Dicky, Stud Department, Saharunpore,—proposed by Dr. Falconer, seconded by Mr. A. Grote.

Dr. W. J. Ellis, of Pubna,—proposed by Mr. Earle, seconded by Mr. Rose.

James Hunt, Esq., Railway Contractor,—proposed by Mr. G. B. Robinson, seconded by Mr. L. Balfour.

James Sinclair, Esq., Accountant, Oriental Bank,—proposed by Mr. Hugh Fraser, seconded by Mr. Earle.

Presentations.

1. Journal of the Indian Archipelago, for June 1851. *Presented by the Editor.*

2. The first number of the "Suttyarnav," an illustrated Magazine in the Bengali language. *Presented by the Revd. James Long.*

Mr. Long mentions that this Magazine will be published monthly: it will contain 12 pages quarto, with two drawings from lead-cuts, one on General History, the other on Natural History. The typographical work is executed exclusively by natives—there is a steady sale of 500 copies monthly.

3. A model tow boat, propelled by oars, moved by simple machinery, to be worked either by coolies or by bullocks. *Presented by H. Harcourt, Esq.*

4. A quantity of cabbage seed gathered in the early part of the year from plants raised from China seed. *Presented by L. Manly, Esq.*

These seeds have germinated 95 per cent. in the Society's Garden.

5. Sample of cotton raised from American seed near Wide Bay, N. S. Wales. *Presented by W. Haworth, Esq.*

The Cotton Committee are of opinion, that this muster, which is too small to admit of a particular examination, has been raised, probably, from New Orleans seed; the staple, though soft, fine and silky, is short and weak, and the cotton appears to have been pulled from the pod before maturity.

A few healthy plants of *Nepenthes* of two species, from the gardens of Mr. E. Blyth and Baboo Rajendralall Mittra, as also plants of *Achimines multiflora*, and *Tigridia pavonia*, from the garden of Mr. Pontet of Bhaugulpore, were placed on the table.

The motions, of which notice was given at the last General Meeting by Mr. Willis Earle, were brought forward and carried unanimously, viz:—

1. "That in future the ordinary Monthly Meetings of the Society be held uniformly in the afternoon of the second Saturday of each month as heretofore, and at the hours of 4 P.M. from October to March, and at 4½ P.M. from April to September, unless circumstances should render it expedient in the opinion of the Council or any General Meeting, to alter the day of the next General Meeting."

2. "That it be an instruction to the Secretary, in giving notice through the Calcutta Newspapers of the Monthly Meetings, to state briefly in the same, the heads of the principal subjects for discussion."

A statement regarding the Testimonial to Mr. Hume, as late Honorary Secretary of the Society, was brought to the notice of the Meeting, shewing that the sum of Rs. 1,661 had been contributed to the present time towards that object, and that Rs. 1,456 thereof had been already collected and deposited in the Bank of Bengal.

Resolved,—**that the President be solicited, on behalf of the subscribers, to communicate with Mr. Hume, in order to ascertain from that gentleman, what would be most acceptable to him in the form of a testimonial, in recognition of his long continued and valuable services to the Society.**

A memorandum was submitted by the Council, shewing that, up to the present time, only one-third of the entire body of members of the Society had sent in returns respecting the proposed removal of the garden, and the appropriation of Rs. 15,000 of the vested fund towards the formation of a new one on the Calcutta side of the river: and recommending, with reference thereto, that a period be fixed—say the 30th September next,—for the reception of votes.

Mr. Hume addressed the Meeting at some length on the above subject, observing that the Council was not authorized, by the terms of the resolution passed at the General Meeting in June last, to call for the votes of Members in regard to the appropriation of any portion of the vested fund; and that the Act itself was in contravention of Section 6, of Chapter XI. of the Regulations of the Society.

The President observed that the Rule contained in Section 6, Chapter XI. had not been violated: for that referred to Resolutions of the General Meeting; and that no General Meeting had resolved on any application of any funds of the Society.

After some discussion, it was *Resolved*, that this Meeting receives these papers not as votes, but as mere expressions of opinion on the subject submitted to the Mofussil and other members of the Society: that it deems any reception of votes by anticipation irregular, and that it reserves the further consideration of the subject until the matter shall be brought regularly before a General Meeting by notice in conformity with the Rules.

The Gardener's Monthly Report was read. Mr. McMurray states, for the information of members or others who may be in want of fruit trees, that he will have about 300 mangoe grafts, and an equal number of peach grafts, ready for issue by the latter end of September or early in October next: further, that there are now 300 tapioca plants ready for distribution. Mr. McMurray adds, that the plants generally—fruit trees, shrubs, and the various crops in the Garden,—have made a healthy and vigorous growth during the last four weeks.

Communications on various subjects.

1. From H. Mornay, Esq., suggesting that the Society procure a "Mather's Churka," precisely similar to that for which the prize of Rs. 500 was awarded by the Society.

Agreed, on the recommendation of the Council, that an application be made to Government on the subject.

2. From H. Harcourt, Esq., intimating his intention of submitting the following machines to compete for the prize of Rs. 5,000.

1st. Two improved self-feeding *churkas.*

2d. An application of power, by which one man can work six *churkas*, or a pair of bullocks 50 *churkas.*

3d. A machine for cleaning, separating the seed, and carding cotton in one operation, cheap, and adapted to the natives of India.

And for the prize of Rs. 500, a simple and cheap machine for cleaning *kuppass* from leaves, sand, &c.

3. From H. Cope, Esq., Secretary of the Agricultural and Horticultural Society of the Punjaub, returning their acknowledgments for the books sent for the use of their library, for the offer of aid in the way of seeds, &c., and add their wish to receive, from time to time, portions of any consignment of seeds that may be made to them for experiments, especially of staple products.

Resolved,—that this application be met as far as the means of the Society will admit.

4. From Major Jenkins, dated Gowhatti, 8th July, suggesting the introduction into India of the South American caoutchouc tree (*Siphonia elastica*) and of the *Urceola elastica* of the Eastern Archipelago.

" The former," observes Major Jenkins, " is a tree, and it may be of a slow growth, but the latter is a creeper and of such quick growth, that if it throve in this country, it might prove very useful to us.

"According to a report in the London *Athenæum*, for April 1851, this creeper extends 200 yards in 5 years, and is from 20 to 30 inches in girth yielding 50 to 60lbs. of *Caoutchouc* one season. I think it not unlikely it would find our climate more congenial than that of other parts of India, and if you could procure any of its seed or young plants I should like to try it. It might probably be cultivated in our *Ficus elastica* forests, and these trees would be admirable supporters of these creepers."

Resolved,—that early steps be taken, as suggested by the Council, to endeavour to procure seeds or plants of the trees alluded to by Major Jenkins.

5. From Capt. C. S. Reynolds, dated Tezpore, Upper Assam, 18th July, requesting the aid of the Society to procure for him seeds of the best description of coffee. "The plant," remarks Capt. Reynolds, "thrives admirably on the hills about the station, but I am doubtful whether the stock I am now growing from is a good one. My plants of two years old are now in full bearing, and so admirably does the tree thrive in our hills, that I am confident this would be a most eligible site for a coffee plantation."

6. From Major Jenkins, to the same effect; also for seeds of the chocolate plant, *Theobroma Cacao.*

Resolved,—that a communication be made to the Superintendent of the Royal Botanic Garden, Ceylon, on the subject of coffee and cacao seeds; and also to Mr. Wheeler, of Hazareebaugh, for coffee seed from his plantation in the proper season.

7. From Dr. Adam Bell, Manager of the Public Garden, Lucknow, applying for vegetable and flower seeds.

Agreed, on the recommendation of the Council,—that the request be complied with for this season, with an intimation that the Society will be glad to obtain hereafter, at cost price, such seeds from other countries, for the above and other gardens, on due notice of their requirements being given.

8. From Mr. D. Landreth of Philadelphia, dated 16th May, advising the despatch, at the end of April, per *William Sturgis*, of the Society's consignment of vegetable, cotton, tobacco and maize seeds. Suggests that the order for next year's consignments should reach him in all January. Referred to the Garden Committee.

9. From Messrs. James Church, Senior, and W. Haworth, returning thanks for copies of Leon's work on the manufacturing and refining of sugar.

10. From Major W. M. McMurdo, President of the Simla Agricultural and Horticultural Association, forwarding a report on the Government Garden at Khyntoo (Annandall), and an account of the prizes distributed at the second exhibition of the Society, for grains, vegetables, fruits and flowers.

(*Saturday, the* 13*th September*, 1851.)

The Hon'ble Sir Lawrence Peel, President, in the chair.

After the proceedings of the last General Meeting had been read, the President drew the attention of the meeting to the Resolution passed on that occasion, and to the discussions that had lately taken place respecting the meaning of the term "confirmed," and stated that, in his opinion, no question that had been decided on the merits, could be re-agitated on the mere question whether the minutes should be confirmed, which question merely involved the fidelity of the report as a record of what had passed, and the consideration whether any rule or law of the Society had been violated by any thing which had been done at the preceding meeting. That on a late occasion, Mr. Bethune had proposed to narrow the confirmation to the first of those two points; but that his motion had been negatived: and that it was incorrect hence to infer that the Society had adopted the very inconvenient course of permitting a question to be re-agitated on the merits without a fresh notice, and he expressed his satisfaction in finding that what had been stated on that point at the last meeting was incorrect. But as the question stood postponed until the October meeting, he should conclude with no motion on the subject.

Mr. Earle said a few words to the effect, that he considered, and had always considered, the word *confirmation* (as used in clause 1, of section 3, chapter XI. of the Bye-laws) to have a much wider signification than that attributed to it by the Honorable President, and that at any rate, its meaning hitherto had not been generally nor clearly understood by the Society. He had not, however, the least objection to the word *confirmation* being limited in the manner laid down by the Honorable President, the same being effected in the usual way by regular notice of motion.

Proposed by Dr. Falconer, seconded by Mr. Speede,—"That that part of the proceedings of the last meeting relating to the postponement of a resolution, carried at a previous meeting, be not confirmed, the same being irregular and informal."

The above motion on being put to the vote was *negatived* ;—and the proceedings were confirmed *in toto.*

Notice of Motions.

1. *By Dr. Falconer* :—"That with reference to Section 3, of Chapter XI. of the Bye-Laws, the confirmation of the proceedings means the verification of the record as a true record, and the opinion of the meeting that the proceedings have been regular : and that it is not competent for any member, at a subsequent meeting, to oppose the confirmation of any resolution that has been carried, except on the ground that the proceeding has been irregular and in violation of some rule of the Society, or that the record is incorrect."

2. *By Mr. Wm. Storm* :—"That having read Mr. Earle's minute of the 14th June last, as likewise the remarks of the Honorable President on the subject of the gratuitous distribution of plants, &c. from the Botanical Garden of the Honorable Company ;—and not conceiving the reasons set forth sufficient to justify the interference of the Society for a discontinuance of such gratuitous distribution,— I beg leave to give notice that at the next monthly meeting it is my intention to propose,—that *the* six resolutions, passed at the meeting of the 14th June, for the discontinuance of a gratuitous distribution of plants, &c. as therein referred to, be rescinded."

3. *By Mr. Geo. Taylor* :—"That having due regard to the purposes for which the Agricultural and Horticultural Society was formed, it is expedient that the gardening and farming operations of the Society should be carried on in some suitable spot on the Calcutta side of the river, and that for the purpose of enabling the Council of the Society to procure a proper site for the formation of a garden on a suitable scale, the garden to be opened to the public under certain suitable restrictions, a sum not exceeding twelve thousand

rupees of the funds of the Society be held at the disposal of the said Council for that purpose."

4. *By Mr. Geo. Taylor*:—"That as considerable additional funds over and above those the Society can afford will be required for carrying out such project, the public be applied to to subscribe funds in aid, and that a Committee be formed for that purpose."

Elections.

Lieut. Geo. Weld; Messrs. H. E. Brae, W. P. Sims, H. J. Lee; Capt. T. Dalyell; Capt. James Ramsay; Dr. C. R. Francis; Major E. J. Dickey; Dr. W. J. Ellis; Messrs. James Hunt and James Sinclair.

Proposals.

Wm. Cumming, Esq., Malda,—proposed by Mr. W. G. Rose, seconded by Mr. P. MacArthur.

Captain Vincent Eyre, Artillery,—proposed by Dr. Falconer, seconded by Mr. A. Grote.

Walter Campbell, Esq., Post Master, Kamarara,—proposed by Mr. C. Cantor, seconded by Dr. Falconer.

Mr. Robert Ross, Calcutta,—proposed by Dr. Falconer, seconded by Mr. Rose.

Geo. Hill, Esq., Calcutta,—proposed by Mr. A. Wallace, seconded by the Secretary.

Stephen Mornay, Esq., Superintendent Assam Tea Company's Plantations,—proposed by Dr. G. M. Porteous, seconded by Mr. D. Begg.

T. A. Campbell, Esq., Post Master at Sumbulpore,—proposed by Lieut. T. Rattray, seconded by Lieut. W. R. Alexander.

Gregor H. Grant, Esq., Indigo Planter, Bhaugulpore,—proposed by Mr. Walter Landale, seconded by Mr. Thomas Grant.

Brande Sapte, Esq., Civil Service,—proposed by Dr. Falconer, seconded by Mr. Grote.

James M. Hall, Esq., Merchant, Calcutta,—proposed by Mr. Wm. Haworth, seconded by Baboo Ramgopaul Ghose.

Baboo Gobind Chunder Dutt, Merchant, Calcutta,—proposed by Baboo Ramgopaul Ghose, seconded by Baboo Peary Chund Mittra.

Presentations.

1. Palms of British East India, by the late William Griffith, Esq., (five copies.) *Presented by the Government of Bengal.*

2. American Ornithology (4 volumes). *Presented by Mr. D. Landreth of Philadelphia.*

3. Journal of the Indian Archipelago for July, 1851. *Presented by the Editor.*

4. Selections from the Records of the Bengal Government, No. 2. Report on Nuddea Rivers. *Presented by the Government of Bengal.*

5. Journal of the Asiatic Society of Bengal for April, 1851. *Presented by the Society.*

6. A Grammar of the Punjabi language, with appendices. *Presented by Sir H. Elliot.*

7. Twelve plants of *Musa Cavendishii.* *Presented by J. Burton, Esq.*

8. A plant of the Kunawur grape-vine. *Presented by R. R. Carew, Esq.*

9. A small quantity of vegetable-marrow seed, gathered in his garden at Dinapore. *Presented by Lieut.-Col. J. H. Handscombe.*

10. A quantity of onion seed. *Presented by the Agricultural and Horticultural Society of Bombay.*

11. A small collection of plants and seeds from the Royal Botanic Garden at Paradinea, near Kandy. *Presented by G. H. Thwaites, Esq.*

12. A model of a horizontal water-wheel of his own invention. *Presented by H. Harcourt, Esq.*

Mr. Harcourt states that the model "is a new combination of the inclined plane and lever. It is cheap and easy of construction, and will, I think, be found useful wherever water power is available."

13. A small coil of rope made by the Muncepoorees from the bark of a tree. *Presented by F. Skipwith, Esq.*

Mr. Skipwith observes,--"It appears to me to have very great strength, but whether it is equal to coir rope I know not. The shrubs or trees from which it is made are, I am told, plentiful, and are about six inches in diameter. The man who brought me the rope has promised to bring me a bough of the tree and some leaves, and if he ever fulfils his promise I will send them to you. The rope is cheap, for the piece sent only cost five pice, the price asked for it."

The President having previously announced to the Meeting that the demise of the Hon'ble Mr. Bethune had caused a vacancy in the list of Vice-Presidents of the Society, submitted, in accordance with Section 5, of Ch. X. of the Rules, the following recommendations of the Council, to be considered at the next General Meeting.

I. That Lieut.-Col. Wm. Sage, a Member of the Council, be recommended to fill the vacancy, in consideration of his long and active services to the Society. The Council in making this recommendation wish to state that, but for the above consideration, they would have preferred to recommend some other gentlemen; so many from their own body having been previously recommended to official posts in the Society.

II. That in the event of the General Meeting adopting the recommendation of electing Col. Sage to the office of a Vice-President, the Council recommend that Mr. W. H. Elliott be nominated to fill the vacancy in their body, caused by such election.

The President likewise read the following tribute of respect from the Council to the memory of their late Associate:—

The Council in recommending a gentleman to the General Meeting of the Agricultural and Horticultural Society as fit to succeed to the office of Vice-President, vacated by the death of the late Hon'ble Mr. Bethune, cannot refrain from an expression of their regret for the loss which their Society has sustained by the demise of one who evinced a warm interest in the Society, and was zealous and active to promote its interests in every instance; as indeed he was on all occasions to promote whatever he deemed for the welfare of the country with which he was latterly officially connected.

Read the usual monthly statement from the Gardener. Mr. McMurray reports favorably of the American vegetable seeds, received last month from Mr. Landreth of Philadelphia; all kinds, with the exception of the lettuce seed, have produced a fair average percentage. The two sorts of cotton seed, "Sea Island" and "Petti Gulph" have germinated 84 and 75 per cent, respectively. The seeds from the Cape having been very recently put in the ground, Mr. McMurray is unable to say more in the present report than that fifteen of the twenty-one kinds have germinated freely. The Gardener alludes to several contributions, all which are in healthy condition; among others ten pine-apple plants from Penang, received from Mr. Arbuthnot Emerson; a plant of *Roupellia grata*, and five of *Combretum grandiflorum*, from the H. C. Botanic Garden; a few varieties of Geranium seed from Lieut. E. Williams of the Engineers, and twelve plants of the Cavendish plantain from Mr. J. Burton.

Communications on various subjects.

1. From the Secretary E. I. and China Association, submitting a favorable report on certain musters of cotton, raised in various parts of India, *from acclimated New Orleans' seed of the ninth generation.*

These are the musters to which allusion is made in the report of the Society's Committee inserted at page 211 of the last published number of the Journal, Vol. VII, Part 2. The Association fix a higher value on each than was assumed by the local Committee, ranging them from 4½*d.* to 7*d.* per lb. On one in particular, which was raised at Cawnpore by Mr. J. G. Bruce, and on which the Committee reported to the effect that "the bolls are large and well filled; *kupass* very clean; the cotton which has been divested of the seed also very clean, and of good color: staple fine, very beautiful specimens. Valued at 5½ per lb:"—the Association state it to be of "bright color, good stout staple, and very clean, worth 6¾*d.* to 7*d.* per lb., being better than fair Orleans."

2. From Mr. Thomas Teil, submitting the "result of his experiments on a quantity of "Dak pulass" or kino of the *Butea frondosa*, (received from Mr.

G. G. Mercer of Eta, as a tanning material. Mr. Teil observes at the close of his report, which is too long for insertion in this place, "it is therefore, in my opinion, of no use as a tanning substance, in the state of the sample sent, but it might perhaps be worthy of attention as a dyeing substance (for its color seems very fast) or for tanning, could its astringent qualities, which are considerable, be easily deprived of so much coloring and gummy matters." Mr. Teil forwards a piece of a small calf-skin which, though subjected to the usual processes, has been scarcely one-third tanned, but is highly colored throughout.

3. From Mr. C. Wheeler, presenting an interesting account of his attempts to establish the cultivation of the coffee plant at Hazareebagh, and its progress to the present time.

The above three communications were referred to the Committee of Papers.

4. From A. Lang, Esq. respecting the cultivation of the heart's-ease and sweet-pea at Allahabad. Mr. Lang writes :—

"I shall feel obliged if you will have the English flower seeds, posted generally to be transmitted by Dâk banghy here to me without delay, they reach this rather too late as regards some of the seeds. The seeds I myself have from England overland in tin and some by letter mail in about a month earlier, and I have the finest stocks and heart's-ease from plants which have germinated by the end of September or first few days in October. The heart's-ease sent to the Society is, I think, poor as compared to what we might have. I had very poor flowers from them last year, whereas from my own imported I had flowers only just under two inches square, and though all of them of course, were not of that size, nearly 200 pots, they were a beautiful sight, and really astonished the natives. The English sweet-pea seed, though it comes up well here, never comes to anything, a few poor flowers may just shew themselves as the hot weather sets in, and then the plants are scorched up, in fact I have come to the conclusion that it is useless sowing them; whereas on the contrary, we have beautiful flowers from our acclimated seed which we have had for many years. I have sown it for 11 years. Last year some pots of sweet-pea sown Sept. 1st for early flowers, flowered by the end of November, and the pots having been afterwards put in the ground, the plants continued to flower for nearly 4 months. Some plants sown later in the ground, the last week in September, when I sow most of my flower seeds, were certainly 8 feet high, and were covered with blossom. If it would be of any use I could supply you next year with 2 or 3 seers of this seed."

5. From Dr. K. M. Scott, intimating his readiness to meet the wish of the Society for seeds of the chocolate tree from the Straits; and that he has taken steps to obtain seeds of *Urceola elastica*, and Borneo nut. "It may be as well to mention," observes Dr. Scott, "in case others may be sending them to you, that the seeds of the chocolate nut *(Theobroma cacao)* are

very apt to spoil, unless rubbed well with dry wood ashes, as soon as taken from the pod. If left in the pod they germinate spontaneously, but if taken out and put into the earth, many of the seeds are lost, unless treated, as above mentioned."

6. From Messrs. C. M. Villet and Son, Cape of Good Hope, advising despatch per *Struan,* of the Society's consignment of vegetable seeds.

At the recommendation of the Council it was agreed to subscribe for one year, as an experiment, to the *Delhi Gazette, Mofussilite, and Lahore Chronicle;* on the understanding that the monthly proceedings of the Society are regularly inserted in those papers.

On the motion of the President, it was agreed that instructions be given to procure two or three model bricks, like those used in the construction of Prince Albert's model cottages for the poor, as specimens for imitation here, if it be found desirable.

Before the members separated it was resolved that the next monthly General Meeting be held on Saturday, the 18th of October, instead of Saturday, the 11th, in consequence of the approaching long holidays.

(*Saturday, the 18th October,* 1851.)

The Hon'ble Sir Lawrence Peel, President, in the chair.

Elections.

Capt. Vincent Eyre; Messrs. William Cumming, Walter Campbell, Robert Ross, George Hill, Stephen Mornay, T. A. Campbell, Gregor H. Grant, Brand Sapte, James M. Hall, and Baboo Gobind Chunder Dutt.

Proposals.

G. R. Wilby, Esq., Editor of the *Mofussilite,*—proposed by the Secretary, seconded by Mr. S. G. Heatley.

R. H. Young, Esq., Indigo planter, Baraset,—proposed by Mr. W. G. Rose, seconded by Mr. P. MacArthur.

Captain J. H. Smyth, Artillery, Jullunder,—proposed by Major J. R. Western, seconded by Major W. Abercrombie.

Captain S. B. Faddy, (36th N. I.,) Executive Officer, Goordaspore,—proposed by Major Western, seconded by Major Abercrombie.

J. H. Driver, Esq., Jessore,—proposed by Mr. G. R. French, seconded by Dr. Huffnagle.

J. C. Wilson, Esq., C.S., Moradabad,—proposed by Capt. G. L. Cooper, seconded by Lieutenant John Eliot.

Captain James Skinner, Commanding 14th Irregular Cavalry,—proposed by Colonel T. E. A. Napleton, seconded by the Secretary.

William J. Longmore, Esq., C.S., Maggoorah,—proposed by Mr. G. R. French, seconded by Mr. H. Brae.

Baboo Kistomohun Chowdry, Zemindar, Midnapore,—proposed by Mr. C. E. Blechynden, seconded by the Secretary.

David Andrew, Esq., Aurungabad,—proposed by Mr. W. G. Rose, seconded by Mr. A. B. Mackintosh.

Maharajah Shreeshchunder Roy Bahadoor, Rajah of Nuddea,—proposed by Baboo Shibchunder Deb, seconded by Baboo Pearychund Mittra.

Captain David Reid, Executive Officer, Deebroghur,—proposed by Mr. Willis Earle, seconded by Mr. Joseph Willis.

J. Gouldhawke, Esq., of Boribaree, Rungpore,—proposed by Mr. W. F. Fergusson, seconded by Mr. H. Rehling.

J. C. Johnson, Esq., Purneah,—proposed by Mr. W. L. Harwood, seconded by Mr. Rose.

J. W. Reeve, Esq., Calcutta,—proposed by Mr. J. S. Elliot, seconded by Mr. W. Stalkartt.

J. F. Bowers, Esq., of Bamundee, Kishnaghur,—proposed by Mr. W. Storm, seconded by Mr. Rose.

Clement Philippe, Esq., of Balacrole, Pubna,—proposed by Mr. R. T. Larmour, seconded by the Secretary.

The motion of which notice was given by Dr. Falconer at the last General Meeting, namely,—

"That with reference to Section 3, of Chapter XI. of the Bye-Laws, the confirmation of the proceedings means the verification of the record, as a true record, and the opinion of the meeting that the proceedings have been regular; and that it is not competent for any member, at a subsequent meeting, to oppose the confirmation of any resolution that has been carried, except on the ground that the proceeding has been irregular, and in violation of some rule of the Society, or that the record is incorrect"—was seconded by Mr. Grote, put to the vote, and carried *unanimously*.

The motion No. 2, by Mr. W. Storm to the following effect, was next submitted :—

"That having read Mr. Earle's minute of the 14th June last, as likewise the remarks of the Honorable President on the subject of the gratuitous distribution of plants, &c., from the Botanical Garden of the Honorable Company: —and not conceiving the reasons set forth sufficient to justify the interference of the Society for a discontinuance of such gratuitous distribution,—I beg leave to give notice that at the next Monthly Meeting it is my intention to propose—that the six resolutions passed at the Meeting of the 14th June, for the discontinuance of a gratuitous distribution of plants, &c., as therein referred to, be rescinded."

Mr. Storm made a few remarks in support of his motion, which was seconded by Mr. William Greenaway. Messrs. L. Clarke and Speede spoke against its adoption. It was then put to the vote and negatived by a majority of twenty-two to twenty-one.

The following motions (Nos. 3 and 4), of which notice was given at the last General Meeting by Mr. George Taylor, on behalf of Mr. A. T. Peterson, were next brought forward :—

"That having due regard to the purposes for which the Agricultural and Horticultural Society was formed, it is expedient that the gardening and farming operations of the Society should be carried on in some suitable spot on the Calcutta side of the river, and that for the purpose of enabling the Council of the Society to procure a proper site for the formation of a garden on a suitable scale, the garden to be opened to the public under certain suitable restrictions, a sum not exceeding twelve thousand rupees of the funds of the Society be held at the disposal of the said Council for that purpose.

"That as considerable additional funds, over and above those the Society can afford, will be required for carrying out such project, the public be applied to, to subscribe funds in aid, and that a Committee be formed for the purpose."

Mr. Peterson addressed the Meeting at some length in support of his motion, which was seconded by Mr. R. W. G. Frith : Colonel Sage, and the President likewise spoke in favor of it, and Mr. Hume against it. It was then put to the vote and carried by a large majority.

Mr. Earle gave the following notice of motion for the next Meeting in regard to the six resolutions which were passed at the General Meeting on the 14th of June last, suggesting a restriction on the free distribution of plants from the H. C.'s Botanic Garden :—

"A. That the words '*Resident in Calcutta and within thirty miles thereof,*' be substituted for the words, '*Resident in British India,*' in resolution No. 3.

"B. That it is recommended, that the plants which, under resolution No 3 are found and deemed to be common in Calcutta and within thirty miles thereof, be defined, and that lists of the same be made out annually, or from time to time as may be needful, and that such lists be published for general information.

"C. That for the formation of these lists, and for the determination of the parties who, under Resolution No 4, shall be deemed entitled to a free distribution of plants generally, a committee sitting in Calcutta, to consist of five persons,—including the Superintendent of the H. C.'s Botanic Garden for the time being,—be appointed by the Government."

The recommendation of the Council, of which notice was given at the last General Meeting,—proposing Lieut.-Col. Wm. Sage for the office of Vice-President of the Society, vacant by the demise of the Hon'ble Mr Bethune, was duly submitted and unanimously adopted.

The second recommendation of the Council,—proposing Mr. W. H. Elliot to fill the vacancy in the Council caused by the election of Col. Sage, to the office of a Vice-President, was also submitted and unanimously adopted.

Submitted a communication from Mr. Carter of London, advising the despatch by the overland conveyance of the usual consignment of annual flower seeds; also a small supply of perennials, bulbs, and fruit seeds. It was agreed, on the recommendation of the Council, that as the quantity of bulbs, &c., is too limited to admit of a general distribution among the members, they be advertised for sale at certain fixed rates.

In consequence of the lateness of the hour, several communications and presentations, which had been received since the last General Meeting, were deferred for the November Meeting.

(*Saturday, the 8th November*, 1851.)

The Hon'ble Sir Lawrence Peel, President, in the chair.

The minutes of the last General Meeting having been read, it was proposed by Mr. W. Storm, seconded by Mr. Hugh Fraser,—"that that part of the proceedings suggesting the discontinuance of the gratuitous distribution of plants from the H. C. Botanic Garden, be not confirmed, in consequence of an irregularity in the voting." On being put to the vote, the motion was *negatived*, and the proceedings were confirmed *in toto*.

Elections.

Messrs. G. R. Wilby, R. H. Young, Captain J. H. Smyth, Captain S. B. Faddy, Messrs. J. H. Driver, J. C. Wilson, C.S., Captain James Skinner, Baboo Kistomohun Chowdry, Messrs. W. J. Longmore, C.S., David Andrew, J. Gouldhawke, Maharajah Shreeshchunder Roy Bahadoor, Captain David Reid, Messrs. J. C. Johnson, J. W. Reeve, J. F. Bowers, and Clement Philippe.

Proposals.

A. M. Vardon, Esq., Merchant, Calcutta,—proposed by Mr. W. G. Rose, seconded by Mr. Earle.

Captain W. J. B. Knyvett, 38th Light Infantry,—proposed by Dr. K. M. Scott, seconded by the Secretary.

W. H. Kerry, Esq., of Purneah,—proposed by Mr. W. G. Rose, seconded by Mr. W. Storm.

Thomas Steers, Esq., Merchant, Calcutta,—proposed by Mr. C. A. Cantor, seconded by the Secretary.

Robert Diggles, Esq., Merchant, Calcutta,—proposed by Mr. Earle, seconded by Mr. J. Willis.

T. A. Donough, Esq., Abkaree Superintendent, Rungpore,—proposed by Mr. H. Rehling, seconded by the Secretary.

A. C. Neame, Esq., Calcutta,—proposed by Baboo P. C. Mittra, seconded by Baboo Radhanauth Sikdar.

M. F. Sandes, Esq., Barrister-at-Law, Calcutta,—proposed by Mr. George Taylor, seconded by Mr. Cantor.

The following motion,—of which notice was given by Mr. Earle at the last General Meeting, in regard to the six Resolutions which were passed at the General Meeting on the 14th of June last, suggesting a restriction of the free distribution of plants from the H. C. Botanic Garden,—was submitted :—

" A.—That the words, ' resident in Calcutta and within thirty miles thereof,' be substituted for the words ' resident in British India,' in resolution No. 3.

B.—That it is recommended, that the plants which under Resolution No. 3 are found and deemed to be common in Calcutta and within thirty miles thereof, be defined, and that lists of the same be made out annually, or from time to time as may be needful, and that such lists be published for general information.

C.—That for the formation of these lists, and fo the determination of the parties who, under Resolution No. 4, shall be deemed entitled to a free distribution of plants generally, a committee sitting in Calcutta, to consist of five persons,—including the Superintendent of the H. C. Botanic Garden for the time being,—be appointed by the Government."

Mr. Earle made a few remarks in reference to the above motion, and submitted the following written observations as explanatory of his views, which it was agreed, should be received and incorporated in the proceedings :—

Questions before the Society.

Certain Resolutions passed at the Society's Meeting of the 14th June 1851, but unconfirmed, regarding the free distribution of plants from the Hon'ble Company's Botanic Garden now referred by vote of the Meeting of the 9th August 1851, for reconsideration next October, with a view to afford time to members, to give due notice at the September Meeting, of such motions as they wish to propose on the subject.

Minute.

1st. Regarding the matter of "Trust" I say nothing further at present, than that I feel disappointed that the original letter of Lieutenant-Colonel R. Kyd to Government, on the formation of the Botanic Garden, lent by Dr. Falconer to the Hon'ble President, and by him read at the Meeting of the 14th June, was not submitted to the Council, to whom the enquiry as to the existence of a trust had been referred.

2nd. Touching the main object of the Resolutions, I do not feel that sufficient reasons have been adduced to warrant, at present, any interference on the part of the Society with the free distribution of plants from the Hon'ble Company's Botanic Garden.

3rd. The injury alleged to be inflicted by the free distribution upon the laborers for profit, in and near Calcutta, seems to me as yet to have no existence. No one has complained, no one has sought our interference, for no one, I believe, has suffered, whilst many have benefitted and will still benefit by the free distribution of plants both common and rare.

4th. The time, I think, is not yet come even for Calcutta and its vicinity, much less for the Mofussil, when as friends of free trade we may feel called upon to act in the way proposed by the Resolutions.

5th. Hence, I object especially to the 3rd Resolution that on an assumption of the gratis distribution of *common* plants from the Botanic Garden being an interference with the "freedom of trade" in and near Calcutta, we suggest to Government to set a price on them, above the ordinary market rate,—to be charged not merely to parties living in Calcutta, but to all private persons resident in "British India."

6th. Supposing the argument to hold good as regards Calcutta and its neighbourhood, I would ask, what right have we to extend its application to the Mofussil? Are we prepared to shew to Government that plants which have become *common here*, through free distribution or otherwise, are equally so throughout the Upper Provinces?

7th. On the contrary, I think that both reasonable inference would shew, and a recourse to facts prove, that many of the Botanic Garden plants which are common in Calcutta and this neighbourhood, become less and less as you recede from the point of free distribution—so that what is abundant here, may be even rare in distant stations.

8th. I therefore submit this question to the Society. Can we with propriety, without first obtaining the consent, or learning the sentiments of the residents in the Mofussil, among whom are 260, 270 or 9-16ths of our own members,—seek to abridge *their* free privilege, because we may be willing to limit *our own* in this particular case and locality?

9th. On resolution No. 4 I will only observe, that it offers to give what I fear, under the very special circumstances stated, will rarely or ever be asked for.

10th. I shall be glad for the reasons stated that the six Resolutions be allowed to drop,—or in other words, that they be not confirmed.

But if confirmed at the October Meeting, I will then and there give notice of, or with leave at once propose,—a modification of rule 3rd, and certain resolutions having for their object the carrying out, in a satisfactory manner, *if possible*, of resolutions 3 and 4.

My view, in moving such amendment and additions, is to render these resolutions 3 and 4 more reasonable and less objectionable, than I know them to be considered by many who are not members of the Society.

September 12, 1851. WILLIS EARLE.

The President and Col. Sage addressed the meeting against the motion, which was then put to the vote and *negatived.*

Notice of Motions.

The following notice of motions were given for the next General Meeting :—

No. 1.—By Mr. Hugh Fraser—" That with the view of giving the Mofussil members another opportunity of expressing their opinion on the subject, the question of addressing the Government respecting the distribution of plants gratuitously from the H. C. Botanic Garden, be reconsidered."

No. 2.—By Mr. Willis Earle—" That the resident members of this Society, when temporarily absent, shall have the same privilege of voting on questions of which one month's notice is given, as is accorded to Mofussil members under Section 8th, of Chapter XI. of the Rules of the Society."

Presentations.

The following presentations were announced :—

1. Papers and Proceedings of the Royal Society of Van Dieman's Land, Parts 1, 2 and 3 of Vol. I. *Presented by the Society.*

2. Fortune's Report upon the Tea Plantations in the N. W. Provinces (10 copies). *Presented by the Government of the N.W.P.*

3. Journal of the Indian Archipelago, for August 1851. *Presented by the Editor.*

4. A copy of the same work, for the same month. *Presented by the Government of Bengal.*

5. Journal of the Asiatic Society of Bengal, for May 1851. *Presented by the Society.*

6. Specimens of Assam cloths, manufactured under Major Hannay's superintendence, of Moonga silk, Rhea and other native fibres worked up together. *Submitted through Major Jenkins, for inspection.*

7. Specimens of tea prepared after the fashion of the Singphoos. *Presented by Major Jenkins.*

8. A slab of peepul wood (*Ficus religiosa*), well polished and beautifully grained. *Presented by C. E. Blechynden, Esq.*

9. A further supply of seed of *Victoria regia*, gathered in the early part of September from the Duke of Northumberland's Garden. *Presented by Dr. Wallich.*

10. A case of camellia and peach plants from China. *Presented by Arbuthnot Emerson, Esq.* These are in excellent condition.

11. A quantity of vegetable seed, acclimated in the public garden at Delhi, consisting of lettuce, brocoli and cauliflower; also a case of poplar and quince plants.

These plants have unfortunately arrived in a perfectly decayed state.

12. Sixteen seers of coffee seed from Chota Nagpore. *Presented by Major Hannyngton.*

Major Hannyngton forwards this seed from having observed applications made to the Society for it by residents in Assam. Major Hannyngton observes: "The Garden made at this station has been sold to a native who promises to use his best endeavours to bring it forward. There is no doubt but that in this district coffee of excellent quality may be produced, but I think its cultivation would require peculiar care and consequently be expensive. Therefore, it requires to be proved whether it can be cultivated profitably. The present proprietor of the Garden, Baboo Sumbhoo Chunder Banerjea, appears to have good hope of final success though he has not made any profit as yet. He would be glad to supply the Society with seed, and any encouragement given to him in this way might be useful in aiding the important experiment that he is carrying on."

13. Three grape-vines of a very superior description from South Carolina. *Presented by Dr. Huffnagle.*

One of the above three was received in a sickly condition, and the other two dead.

14. A quantity of coffee and chocolate seed. *Presented by G. H. Thwaites, Esq., Superintendent Royal Botanic Garden, Ceylon.*

The chocolate seed has reached in an unserviceable condition.

15. A basket of orchids, from Khoolna, in Jessore. *Presented by R. W. G. Frith, Esq.*

16. A few sorts of seeds, from the West Indies, consisting of neesberry, star-apple, and sweet orange. *Presented by E. M. Cowell, Esq.*

17. Six mango seedlings of a superior sort. *Presented by Wm. Thomson, Esq.*

18. Four kinds of fresh strawberry seeds, received from England by the last steamer. *Presented by Willis Earle, Esq.*

19. Four grape-vine plants of the finest sorts, from Mootecharee. *Presented by W. H. Elliot, Esq.*

20. A quantity of acclimated mignonette seed. *Presented by P. Rayson,*

21. A few blossoms of lavender, raised in his Garden at Dorunda from plants of three years old, which have been exposed in the open air all the year round. *Presented by Lieutenant T. Rattray.*

A recommendation was brought up from the Council in regard to the Testimonial to Mr. Hume. The Council suggest that the Testimonial be in the form of a breakfast service in silver, with devices or ornaments appropriate to the occasion, and that it bear the following inscription :—"Presented to James Hume, Esq., as a token of his valuable services as Honorary Secretary of the Agricultural and Horticultural Society of India, during a period of eight years, 1851."

The Council further recommend, that the assistance of Dr. Wallich be solicited on this occasion ; that he be requested to place himself in communication with an eminent Silversmith in London, with the view of obtaining the breakfast service in question, and that a bill of exchange for the equivalent of Rs. 1500, from the sum of Rs. 1686 subscribed for this purpose to the present date, be transmitted to Dr. Wallich to enable him to carry out the above recommendation.

Resolved, that the recommendations of the Council be adopted.

The President having brought to the notice of the Meeting that, by an oversight, the names of the gentlemen to serve on the Committee, which had been appointed at the last General Meeting for the purpose of collecting subscriptions for the new Garden, had not then been given in,—it was moved by Mr. Peterson, seconded by Mr. Hugh Fraser, and *Resolved*—that the following Gentlemen form the Committee :—Messrs. L. Clarke, Geo. Taylor, Spencer Judge, James Cowell, E. Blyth, C. Durschmidt and W. F. Fergusson : the Members of the Council, to be *ex officio* Members of the Committee, and any five to form a quorum.

The Gardener's monthly reports for September and October, were submitted, together with a tabular statement shewing the germination of the American and Cape vegetable seeds of the present season, which is altogether favorable, two or three kinds, such as lettuce, leek and carrot, being excepted.

Mr. McMurray states, he has now ready for distribution to the Members whose names have been registered, a lot of mangoe and peach grafts ; he has also 50 peach grafts derived from the American stock received in the Garden in March 1850. The Gardener further reports that about 2,500 sugar-canes of various kinds are now available, and should be applied for without delay by those who may be desirous of obtaining supplies for the present season ; as also for arrow-root tubers which are now fast advancing to maturity.

In connection with the above, a letter was read from Mr. Dougherty, of the Barrackpore Park, respecting the American and Cape vegetable seeds.

Mr. Dougherty reports favorably of both assortments, with two or three exceptions; he considers that the American, though good, has not been so carefully selected as that of last year, while the Cape batch is very fresh, and all the seeds have germinated very freely, with the exception of turnip, radish, and Windsor bean.

A report from the Garden Committee was next submitted respecting the consignment of seeds for next season from the United States. The Committee suggest that the sum of 1736 dollars be appropriated for vegetable, cotton, maize, tobacco, and a small assortment of indigenous seeds; and that certain quantites of each, as named in their report, be obtained. The report of the Committee, which was recommended by the Council, was adopted.

Communications on various subjects.

The following letters were also submitted :—

1. From Lieut.-Col. T. E. A. Napleton, Honorary Secretary, Branch Agricultural and Horticultural Society, Delhi, respecting the present state of the public Garden under his charge. The following are extracts from Col. Napleton's communication :—"Will you make known to the Parent Society that the bad state of my health has, for many months past, completely put it out of my power to write an occasional report even of the progress towards completion of the Delhi Branch Garden under my charge; and though now unable to undertake so pleasing a duty as fully as I could desire, I have much pleasure in making known the following items :—

"The whole of the Garden, 28 bigahs in extent, has been laid out; carriage drives 22 feet broad, walks of all descriptions, finished, and gravel put down on most of them; three handsome summer houses for the flower plants have been finished. The flower gardens completed with choice designs. The vegetable grounds all but finished, and have been well ploughed and manured, and the seeds sown are germinating beautifully in a fine new soil. Pucka water-courses have been constructed, entrance gateways finished. Another well of excellent water nearly completed on a high piece of ground where the canal water could not be conveyed.

"The young trees and plants throughout the grounds present a most healthy appearance, some of the poplar trees have attained a height of 12 and 14 feet, and are flourishing admirably. I have prepared many more poplar cuttings for the Parent Society, and shall have a dozen more young quince trees ready soon."

Col. Napleton observes that the expences of the monthly establishment, which he details, are Rs. 136, and he goes on to state :—"The foregoing expence is met by monthly subscriptions from the residents of Delhi, 40 Rupees is subscribed by natives, and the rest by the European portion of the society, but it is with some difficulty we can at times manage to get the whole sum subscribed, but I hope ere many months have passed away to see an addition to the subscription list. The seeds produced last season in the public garden have realized 500 Rupees, and thus the buildings and other expensive works have been completed. The labor, the anxiety, the constant supervision in an impaired state of health undergone by me in this undertaking, I will not attempt to describe; there is one thing, however, I hope the Parent Society will understand, which is, that I have done my very utmost to forward the cause of Agriculture and Horticulture, for which I claim no praise, no credit. If my leisure hours are employed usefully there is a satisfaction in that alone, which amply repays me."

2. From Captain A. Thompson, reporting on the muster of rope made by the Munnepoorees, received from Mr. Skipwith, and presented at the September meeting.

3. From Messrs. P. S. D'Rozario and Co., offering the aid of their Press to print *gratis* one thousand copies of the address respecting the proposed new garden, which it is proposed to circulate to all the Members of the Society.

The Secretary mentioned, that having previously given the order to the Bishop's College Press, he was unable to avail himself of Messrs. D'Rozario's liberality.

Resolved,—that the best thanks of the Society be given to Messrs. D'Rozario and Co. for their handsome offer.

4. From Messrs. Grindlay and Co., London, advising the despatch per overland mail of a box of vegetable seeds from Messrs. Lawson and Son of Edinburgh.

This consignment, which is a small one, was intended originally for distribution among the resident members only; but in consequence of the non-receipt of the supply from Van Dieman's Land, which was intended for Mofussil members, it was agreed, on the recommendation of the Council, to subdivide the above quantity, and distribute it to all applicants.

5. From Mr. James Carter, intimating his inability, as originally proposed, to forward the remainder of the bulbs and fruit seeds by the September steamer, but promising to send them by the next opportunity.

Resolved,—that the stock in hand be distributed without further delay to those members who have registered their names, and that the remainder be forwarded to them when received from Mr. Carter.

The following extract from Mr. Carter's letter, regarding the despatch of flower seeds by the August steamer, is given for the information of the members generally:—

"I trust you will have received the eleven cases in fine condition as I took the greatest care in packing and arranging them. It might be necessary to inform subscribers that some seeds as larkspurs, particularly the annual, viz., such as sent last, do not well bear transplanting. Perhaps it would be also beneficial to their interest to state that, if in transplanting mixed *annuals* or *perennials* they were to observe the foliage carefully, they might separate many of the varieties and species which would, in many cases where the diversity of the height is great, be of advantage."

Applications for vegetable and flower seeds were submitted from the Managers of the public gardens at Azimghur, Mirzapore and Berhampore.

The Secretary stated that these applications had been met by desire of the Council in the present instance, with an intimation that the Society will be prepared to obtain hereafter, at cost price, such seeds from other countries for the above and other gardens, on due notice of their requirements being given.

(*Saturday, the* 13*th December,* 1851.)

The Hon'ble Sir Lawrence Peel, President, in the chair.

The minutes of the last General Meeting were read and confirmed.

Elections.

Capt. W. J. B. Knyvett, Messrs. A. M. Vardon, W. H. Kerry, Thos. Steers, Robert Diggles, T. A. Donough, A. C. Neame, and M. F. Sandes.

Proposals.

T. Kenny, Esq., of Salgumadea, Commercolly,—proposed by M. R. Dodd, seconded by Mr. W. G. Rose.

J. P. Thomas, Esq., Calcutta,—proposed by Mr. Dodd, seconded by Mr. Rose.

Justin Finch, Esq., of Shahpore, Oondee, Tirhoot,—proposed by Mr. W. Earle, seconded by Mr. J. Willis.

Rajah Jye Mungul Sing, of Ghadour, Monghyr,—proposed by Mr. John Bean, seconded by the Secretary.

P. Durand, Esq., Neschinderpore factory, Jessore,—proposed by Mr. R. C. Bell, seconded by Mr. Geo. McNair.

George Pauling, Esq., of Poopree factory, Tirhoot,—proposed by Mr. W. Greenaway, seconded by the Secretary.

A. D'Cruz, Esq., Junior, Calcutta,—proposed by Mr. Rose, seconded by Mr. C. J. Sutherland.

The Honorable C. R. M. Jackson,—proposed by Sir Lawrence Peel, seconded by Mr. M. Wylie.

The motion No. 1, of which notice was given by Mr. Hugh Fraser at the last Meeting,—" That with the view of giving the Mofussil members another opportunity of expressing their opinion on the subject, the question of addressing the Government respecting the distribution of plants gratuitously from the H. C. Botanic Garden be reconsidered," was brought forward, seconded by Mr. J. Sinclair, and *carried.*

The motion No. 2, by Mr. Willis Earle,—"That the Resident Members of this Society, when temporarily absent, shall have the same privilege of voting on questions of which one month's notice is given, as is accorded to Mofussil members, under Section 8, of Chapter XI. of the Rules of the Society," was also submitted, seconded by Baboo Radanauth Sikdar, and *negatived.*

Notice of Motions.

The following notice of motions was given for the next General Meeting:—

No. 1.—*By Mr. Willis Earle.*—"That the six Resolutions, regarding the free distribution of plants from the Hon'ble Company's Botanic Garden, passed at the meeting of the 13th June last, be rescinded."

No. 2.—*By Mr. W. G. Rose.*—"That this Society respectfully submit to the Government of India that it would tend to promote Horticulture, if the Hon'ble the East India Company were to cease distributing plants gratuitously from their Garden, to persons resident in India, after three years' notice being previously given to that effect."

Presentations.

1. Report of the Bombay Chamber of Commerce, for 1850-51. *Presented by the Chamber.*

2. Journal of the Indian Archipelago, for September 1851.. *Presented by the Editor.*

3. Selections from the Records of the Bengal Government, No. 4: Report by the Railway Commissioner, 1851. *Presented by the Government of Bengal.*

4. Journal of the Asiatic Society of Bengal, No. VI. 1851. *Presented by the Society.*

5. A case of mango grafts and fig cuttings. *Presented by the Agricultural and Horticultural Society of Bombay.*

These have arrived in excellent condition.

6. A small assortment of seeds (names not given) from the Punjaub. *Presented by Capt. T. C. Blagrave.*

7. A few seeds of vegetables and a small collection of flower bulbs, from Monsr. Lafon, Seedsman at Bourdeaux. *Presented by E. E. Dubus, Esq.*

8. Two cakes of soap made from the oil of the *Mahwa* seed *(Bassia latifolia)* without the addition of tallow or of any other fat. *Presented by Monsr. Caffarel of Monghyr.*

9. A muster of fibre (description not given) from Upper Assam. *Presented by Lieut.-Col. Jenkins, on behalf of Major S. F. Hannay.*

A very favorable report was submitted from the Hemp and Flax Committee on the above parcel.

10. Samples (1 and 2) of coffee raised at Tezpore, in Upper Assam. *Presented by Captain C. S. Reynolds.*

Captain Reynolds is not aware from what stock these seeds have been raised, but he believes that all the coffee in Assam, has been obtained from the seeds of some plants received from the Botanic Garden.

A report from the Coffee Committee on the above musters was laid on the table.

The Gardener's Monthly Report was submitted. Mr. McMurray speaks most highly of the vegetable seeds received by the November steamer from Messrs. Lawson and Son, of Edinburgh. Of the 71 kinds of flower seeds received by the October steamer from Mr. Carter of London, 56 have already germinated freely. The Gardener reports that the contribution from Major Hannyngton, of Chota Nagpore, of coffee seeds, has proved a total failure: and that the supply received from the Royal Botanic Garden at Ceylon, has not yet germinated, though sown three weeks ago. Mr. McMurray adds, that he can now supply a quantity of cabbage and cauliflower plants to any members desirous of them; and that in a short time hence he will be able to distribute plants of herbs of various kinds raised from the Edinburgh seed; as also of seedlings of annuals from Mr. Carter's stock.

Communications on various subjects.

The following letters were likewise submitted :—

1. From Charles Moore, Esq., Director of the Botanic Garden, Sydney; on the subject of vine plants, and their distribution :—

"I would now beg to state, as well for your information, as for that of the Secretaries of other similar Societies to your own, that I have under my charge a fine collection of vines of nearly 200 varieties, and that I will be happy to supply cuttings of these or indeed of any thing else which this Garden can afford, upon the application of the Secretary of any Agricultural or Horticultural Society in the East Indies; in return, I should be glad to receive plants, or the seeds of plants, valuable for the purposes of economy, the arts, or the sciences. May I, therefore, beg that you will have the goodness to make this known to all of your correspondents who may feel an interest in the advancement of such matters."

2. From A. Sconce, Esq., suggesting that the Society offer quarterly premia for the best samples of dried plantains.

The Council, to whom Mr. Sconce's communication had been referred, are of opinion that premia are not required for the above, it having been already tried and found to answer remarkably well; and that it may be safely left to private enterprize to turn it to account as an export article.

The opinion of the Council was adopted.

3. From H. Cope, Esq., conveying the thanks of the Agricultural and Horticultural Society of the Punjaub for certain books presented to their library by the Agricultural Society of India.

4. From Mr. James Carter, advising the shipment of the remainder of the flower bulbs and fruit seeds to complete the consignment of the season. These have been lately received and distributed.

Before the Meeting separated it was *resolved*:—

1st,—That the Garden Committee be requested to report to the next General Meeting respecting consignments of seeds for next season.

2nd,—That the Floricultural Committee and Fruit and Kitchen Garden Committee, be authorized to make the necessary arrangements respecting the approaching flower and vegetable shows.

3rd,—That the Secretary (as recommended by the Council) be authorized to collect subscriptions on account of the proposed new Garden, placing the same in the Bank of Bengal.

Report from the Council to the Anniversary Meeting, January 10th, 1852.

The Council have to make the following Report to the Members of the Society on the occasion of their present Anniversary Meeting.

And, in the first place, they have much satisfaction in stating that the number of new Members that have been elected during the past year, namely 122, exceeds that of any previous year, except 1837, since the formation of the Society. Agreeably to former usage the classification is here given, and stands thus:—

CLASSIFICATION.	In 22 former years.	In 1843.	In 1844.	In 1845.	In 1846.	In 1847.	In 1848.	In 1849.	In 1850.	In 1851.	Gross Total.	Total real number at close of 1851, after deducting lapses.
Honorary Members,	10	1	0	0	1	0	1	0	0	0	13	9
Associate Members,	1	0	1	0	0	0	0	0	1	1	4	4
Corresponding Members,	0	0	0	0	1	0	0	0	0	1	2	2
Civilians,	192	14	17	9	13	15	22	8	10	22	322	148
Merchants and Traders,	160	16	10	15	14	12	13	10	14	20	284	122
Indigo and other Tropical Agriculturists,	167	15	6	2	15	6	5	1	9	19	245	80
Military Officers,	127	16	4	13	10	11	11	11	9	34	246	118
Medical Officers,	73	1	4	2	0	2	3	5	7	4	101	30
Asiatics,	51	5	1	6	2	14	5	6	9	8	107	52
Clergy,	12	1	0	1	1	0	0	0	2	1	18	6
Law Officers,	34	2	2	2	1	0	0	6	4	6	57	22
Miscellaneous,	7	0	2	0	0	2	0	2	2	6	21	15
	834	71	47	50	58	62	60	49	67	122	1420	608

The total number of Members at the close of December 1850 was 527. This, with the addition, as above mentioned, of 122, makes the gross total number of Members up to the present time to amount to 649. From this must be deducted deaths 13, resignations 20, and 8 whose names have been removed from the list, their subscriptions being irrecoverable, in all 41, making the real number now borne on the records of the Society to be 608. Of this number 37 are Members who have compounded for their subscriptions, 61 are absent from India, 9 are Honorary, 2 Corresponding, and 4 Associate Members, making in all 113 to be deducted, and thus leaving 495 as the actual number of *paying* Members, instead of 416 as last year.

Among the deaths recorded the Council regret to specify that of the Honorable Mr. Bethune, a Vice-President of the Society, who, though he had been connected with the Institution but a comparatively short period, evinced a warm interest in its proceedings, and was zealous and active to promote them. They have also to notify the demise of 12 other Members, namely, Mr. H. H. Bell, Indigo Planter at Agra, for many years an active and useful correspondent; Mr. John Barton, Merchant, Calcutta; Mr. W. C. Lochner, of the Civil Service; Mr. F. R. Hampton, Merchant, Calcutta; Captain Copps of the Steamer *Enterprize;* Lieut. Wm. Hay of the Bengal Army; Mr. R. B. Lake, Merchant, Calcutta; Mr. Charles Tucker, of the Civil Service; Mr. Jeffrey Finch, Indigo Planter; Mr. F. Bailey, Merchant; Dr. John Reddie, Advocate; and Mr. J. F. Cathcart, of the Civil Service.

The Council have to report favorably on the condition of the Finances of the Society, and to submit the usual statements of receipts and disbursements, vested fund, liabilities, and arrears of subscription. As regards the former, it will be seen that the total receipts amount to Rs. 21,630-4, to which sums has to be added the further amount of Rs. 1,041-14-10, being balance at the close of 1850. The disbursements during the year have been Rs. 21,549-9-8, leaving a cash balance in Bank of Bengal, and in the hands of the Government Agent, of Co.'s Rs. 1,095-7-2, and with the Treasurer Rs. 27-2, forming a total of Rs. 1,122-9-2, on the 31st December, 1851.

The Vested Funds in the hands of the Government Agent, as per account rendered to 31st December, amounts to Rs. 22,366-10-8 in the 4 and 5 per cent Government Loans.

The Council do not deem it necessary to draw attention to any particular item of receipt or disbursement, as the statements furnish full particulars in detail, and these, as usual, will be printed as an appendix to this report.

The arrears of subscription at the end of 1850, as stated in the last report, amounted to Rs. 6,473-12-9. Of this the sum of Rs. 3,561-0-9 has been collected, leaving a balance of Rs. 2,912-12, of of which Rs. 878 may be considered as irrecoverable. The balance of these arrears, after the above deduction, is Rs. 2,034-12, which being added to the unpaid subscriptions of 1851, forms a total due to the Society of Rs. 6,278-13-6, as explained in lists 1 to 3

The liabilities of the Society are Rs. 4,134, being balance of cost of seeds for the past season: these will be more than liquidated by arrears due for subscription, for seeds, grafts, &c. disposed of by the Society, and the Cash balance, which form a total of Rs. 8,534-14-8.

The Council have had under consideration the establishment of a new garden on the Calcutta side of the river, in place of the present garden, the situation of which is deemed too remote to be constantly visited by the Members and others who take an interest in horticulture. The appropriation of Rs. 12,000 out the Society's accumulated capital of Rs. 22,000, to form the nucleus of a fund for this object, has been assented to by the majority of the Members both in Calcutta and the Mofussil. Should sufficient subscriptions not be realized for obtaining a good site on the banks of the river, it is proposed to place the garden on the most fit and convenient spot that can be procured elsewhere, in the vicinity of Calcutta. As fully expressive, in a few words, of the principal objects contemplated by the proposed move, the Council desire to put on record the following extract from an appeal which has been lately made to the Members of the Society individually, and to the public, with the view of increasing the sum appropriated by the Society:—

"It is confidently expected that this garden will be in every way worthy of the Society; that the establishment of it will promote in many ways the progress of the science of Horticulture, as well in its more important branches, as in the less important, but more attractive, branch of Floriculture. The garden will be constantly open to the observation of the Members of the Society, and its governing body, and of the public generally; and opportunities will thus be constantly afforded of comparing cultivation there, with cultivation elsewhere, and the practical cultivators will thus steadily obtain instruction: whilst, it is hoped that the garden will be henceforth, under skilled superintendents, a Training School of gardeners and cultivators. Whilst advancing the objects of the Society, it is desired to give to the public generally a resort to a near and pleasant place of recreation, which Calcutta greatly needs. This is particularly needed for families, and, subject to the ordinary restraints against any abuse of the privilege, it is proposed to give the public generally a free admission to the garden at all convenient hours and times."

The Council are happy to announce that the importations of flower and vegetable seeds from the Cape, North America, and Great Britain, have proved, with few exceptions, as good as those of 1850; that from Messrs. Lawson and Son, of Edinburgh, especially, reached in such excellent condition, that it is a source of regret that consignments from that quarter cannot be received earlier in the season, so as to admit of a general dissemination to Members throughout the country: it arrived in the early part of November by the overland conveyance, and was distributed to Members resident in Calcutta and its vicinity. A consignment of vegetable seeds has also been ordered from Hobart Town for Mofussil Members, under the impression that it would reach its destination in July or August, but to the present time, no tidings have been received of it.

The usual exhibitions of flowers, vegetables and fruits were held during the past year under tents in the Auckland Garden, on the 24th of January, 1st of March, and 11th of April; on which occasions prizes to the amount of Rs. 959 and four silver medals were distributed. The competition was very fair at all these shows, but more especially, as regards vegetables and fruits, at the exhibition in January; and, in respect to flowers, at the show in March. On the last named occasion the competition was greater than at any previous exhibition that has taken place: the produce of about 50 gardens was submitted, which may be deemed encouraging, when it is considered that these floricultural exhibitions have been but recently established, as compared to those of vegetables and fruits; and that at the first, which was held in 1845, the competition was limited to five persons, whose united productions scarcely exceeded 50 plants. The attendance of visitors was also considerable at the exhibition in March, greater indeed than on any previous occasion of a similar nature, it being calculated that upwards of 2000 persons were present. This circumstance, combined with the annually increasing competition, prove that these periodical shows have had the effect of creating a greater interest in this pleasing pursuit than previously existed. The general arrangements for the display of the various specimens submitted on these occasions, though still open to improvement, have been pronounced by the judges to be very good, and a decided improvement on the shows which were formerly held in the Town Hall.

In the early part of the past year the Society was officially informed of the formation at Lahore of an Agricultural and Horticultural Society for the Punjaub. From subsequent communications it would appear to be progressing satisfactorily, and likely to prove of benefit hereafter towards developing the resources of that large and fertile province. The recently established Society at Delhi is also prospering under the care of Lieut.-Col. Napleton, through whose zealous efforts a public garden of 10 acres in extent has been formed in a comparatively short period at that station.

The Council cannot close this brief Report without adverting to the resignation, during the past year, by James Hume, Esq., of the office of Honorary Secretary, which he has held for a period of 8 years; and placing on record the following resolution which they passed on the receipt of his letter:—"Resolved,—that the Council cannot submit this letter of resignation to the next General Meeting without expressing their regret at Mr. Hume's retirement, and at the loss of his valuable services, extending over a period of 8 years; and they doubt not the same will meet with a suitable acknowledgment from the Society." At the subsequent General Meeting, held in April, the following resolution was unanimously agreed to:—

"That the Society in accepting the tender of Mr. Hume's resignation of the office of Honorary Secretary, returns its cordial thanks for his valuable services during a period of 8 years; and desires to put on record the sense which it entertains of the unremitting zeal, ability, and attention, which Mr. Hume has on all occasions devoted to the business of the Society.

It was recommended by the Council, on the same occasion, that a suitable acknowledgment of Mr. Hume's services might be made by means of a private subscription amongst the individual Members of the Society, and the Meeting fully concurring in that suggestion expressed its readiness "to carry out any object tending to mark the sense it entertains of the late Honorary Secretary's services."

The sum subscribed, in pursuance of this object, amounts to Rs. 1686, and it having been determined that the Testimonial should be in the form of a breakfast service, in silver, with devices or ornaments appropriate to the occasion, to be *manufactured in England*, and that the kind offices of Dr. Wallich, *who is residing in London*, should be solicited on the occasion, the sum of Rs. 1500 has been remitted to that gentleman to enable him to carry out the wishes of the subscribers.

It only remains to add, by way of record, that it having been deemed inexpedient to fill the vacancy caused by Mr. Hume's retirement, Mr. Blechynden, who has performed for many years the duties of Deputy Secretary of the Society, has been elected to the Office of Secretary.

Statement of Receipts and Disbursements of the Agricultural and Horticultural Society of India, from 1st January to the 31st December, 1851.

RECEIPTS.

From Members; Subscriptions collected during the year for the ordinary purposes of the Society, ...		15,353 13 9
,, Ditto, additional temporary subscriptions to assist in meeting the Society's proportion of the debt on the Metcalfe Hall, ...		2 0 0
,, Government annual donation, ...	1,045 0 0	
,, Ditto, monthly allowance for 12 months, at 135-13-6 per month, ...	1,630 2 0	
,, Sir Lawrence Peel, donation to the Society for the year, to encourage the culture of flowers, &c., ...	400 0 0	
		3,075 2 0
,, Accruings of interest on fixed assets, ...		1,010 0 0
,, Proceeds of Sugar cane delivered from the Nursery Garden, including the cost of packing, ...	34 4 6	
,, Ditto Mango, &c., grafts, Ditto from ditto, ...	216 8 3	
,, Ditto of 10 maunds of Jute raised in the Garden, ...	20 0 0	
,, Ditto of a proportion of surplus Cape and American vegetable and English flower seeds, bulbs, and fruit seeds, ...	1,694 8 0	
,, Ditto of Copies of the Transactions of the Society, ...	96 0 0	
,, Ditto of Copies of the Journal, ...	75 12 0	
,, Ditto of Copy of Fenwick's Hand-book of Gardening, ...	2 0 0	
,, Ditto of old seed casks, &c , ...	2 10 9	
,, Ditto of Doob Grass seed, (cost of gathering), ...	4 8 0	
,, Members, being the amount of freight, &c., on boxes of seeds to their addresses, paid by the Society in 1849-50, ...	11 1 6	
,, Members, amount repaid for postages, &c., packing charges for seeds, &c., ...	10 13 3	
,, J. G. Bruce, expences incurred in the transmission of Cotton seed, ...	4 6 0	
,, Public Library, its proportion of cost for certain repairs to out-offices of Metcalfe Hall, ...	16 12 0	
		2,189 4 3
Total receipts, Co.'s Rupees, ...		21,630 4 0
By Balance in the Bank of Bengal on 31st December, 1850, ..	219 5 10	
,, Ditto in the hands of Government Agent ditto, ...	811 3 0	
,, Ditto in the hands of Secretary ditto, ...	11 6 0	
		1,041 14 10
Grand Total, ...		22,672 2 10

DISBURSEMENTS.

FOREIGN VEGETABLE AND FLOWER SEEDS.

By Messrs. C. N. Villet, for Cape Garden seeds supplied in 1851, ..	2,036 0 0	
,, Mr. James Carter, for English flower seeds supplied in 1850 and 1851, ...	4,128 0 1	
,, Messrs. Lawson and Sons, for Edinburgh Vegetable seeds supplied in 1850, ...	36 4 0	
,, Messrs. Braddon and Co., for a box of Cape Bulbs, ...	8 0 0	
,, ——— Ditto, for a packet of Cape Perennial seeds, ...	8 0 0	
		6,216 4 1

MEDAL						
By Messrs. Hamilton and Co., for supplying 3 Silver Medals, ...				36	0	0
LIBRARY.						
,, Books purchased during the year, for the Library, ..	256	8	3			
,, Binding Books, during the year, ...	23	0	0			
				279	8	3
PRINTING.						
,, Sundry parties for printing receipts and schedules of prizes for flower shows, circular letters, &c., ...				226	14	0
JOURNAL.						
,, Bishop's College Press for printing part 2 of Vol. 7, ...	796	4	0			
,, Mr. Stapleton, for lithographing and coloring plates for ditto, ..	82	0	0			
				878	4	0
NURSERY GARDEN.						
,, Ordinary expences incurred on account of the Nursery Garden, from 1st December 1850 to 30th November 1851, ..	3,405	14	6			
,, Extraordinary ditto for a Cart and Wheelbarrows, for the purchase of plants and for glazing Gardener's Bungalow, ..	249	13	3			
				3,655	11	9
ESTABLISHMENT.						
,, Amount for Establishment from 1st December 1850 to 30th November 1851, ...				5,769	3	6
PECUNIARY REWARDS.						
,, Prizes to Mallees for vegetables and fruits at the Exhibitions held on the 24th January, 1st March and 11th April 1851, ..	552	0	0			
,, Ditto to ditto for flowers at the Exhibitions held on the same dates,	407	0	0			
,, Delhi Branch Society's annual donation for 1851, ...	100	0	0			
,, Ditto the value of 4 silver medals for 1850 and 1851, ..						
				1,059	0	0
,, Advertising in the Calcutta and Up-country Newspapers, notices of general meetings, of shows of vegetables and flowers, distribution of seeds, &c., &c., ...				402	7	6
STATIONERY.						
,, Stationery for office books, and for the use of the office, and brown packing paper for packing seeds, ...				181	7	6
FREIGHT.						
,, Freight on boxes of seeds, books, &c. sent and received from the Cape of Good Hope, England, America, &c., ...				311	1	3
METCALFE HALL.						
,, Assessment on Metcalfe Hall from May 1850 to October 1851, (Society's proportion of,)	157	8	0			
,, Jessop and Co., in full of a moiety of their bill for iron railing for the Metcalfe Hall, ...	590	9	3			
,, Burn and Co., white-washing, painting, &c. 4 of the out offices of Metcalfe Hall, ...	60	0	0			
,, Ditto, Society's proportion of quarterly allowance for inspecting the Metcalfe Hall from 1st November 1850 to July 1851. ..	45	0	0			
,, Sundry parties for various articles of furniture, ...	58	8	3			
				911	9	6

POSTAGE AND SUNDRY OTHER CHARGES.

By Postage on letters, &c., sent and received, and copies of the Journal and for petty expences, ...	654 12 0	
,, Extra packermen for subdividing seeds, ...	36 15 0	
,, Mr. J. G. Bruce, refund of balance at credit on account his subscription, ...	84 14 6	
,, Botanic Garden for a glazed case for plants sent to M. Bojor, Mauritius, ...	16 0 0	
,, For expences incurred in putting up a fence round a portion of the Auckland Circus, for superintending the erection of tents, for refreshment and conveyance for Band, &c. for flower and vegetable shows during the year, &c., ..	358 0 6	
,, Presents to Constables for attending at Horticultural and Floricultural Exhibitions during the year, ...	94 0 0	
,, Mrs. D'Cruz, for her gratuity for 12 months, at 30 Rs. per month,	360 0 0	
,, Government Agents' commission, brokerage, &c. charges during the year, ...	3 8 4	
		1,608 2 4

FENWICK'S HAND-BOOK OF GARDENING.

,, Administrator General, proceeds of 7 copies of Fenwick's Handbook, ...		14 0 0
Total Disbursement, Co.'s Rs.		21,549 9 8
,, Balance in the Bank of Bengal on 31st December 1851, ..	677 12 6	
,, Ditto in the hands of Government Agent ditto, ...	417 10 8	
,, Ditto in the hands of Secretary ditto, ...	27 2 0	
		1122 9 2
Grand Total, Co.'s Rs.		22,672 2 10

MEMORANDUM

DISBURSEMENTS.

To Amount of Disbursements during the year 1851, as per statement, ...		21,549 9 8
,, Balance in the Bank of Bengal on 31st December, 1851, ...	677 12 6	
,, Ditto in the hands of the Government Agent on ditto, ...	417 10 8	
,, Ditto in the hands of Secretary on ditto, ...	27 2 0	
		1,122 9 2
Total, Co.'s Rs.		22,672 2 10

LIABILITIES

Amount due by the Society for American vegetable, &c., seeds, in 1851, ...	Sp. Drs. 1,714 .. 0 =	3,430 0 0
Ditto for Edinburgh vegetable seeds, ...	£ 38 0 0 =	380 0 0
Ditto for Van Dieman's Land Ditto, ...	£ 32 8 4 =	324 0 0
		4,134 0 0
Amount voted towards the fund for the formation of a garden on the Calcutta side, ...		12,000 0 0

RECEIPTS

By amount of Receipts during the year 1851, as per Statement, ...		21,630 4 0
,, Balance in the Bank of Bengal on 31st December, 1850, ...	219 5 10	
, Ditto in the hands of Government Agent on Ditto, ...	811 3 0	
,, Ditto in the hands of Secy Ditto, ...	11 6 0	
		1,041 14 10
Total Co.'s Rs. ...		22,672 2 10

DEPENDENCIES.

Amount invested in Government Securities, lodged in the Government Agency Office, ...		22,366 10 8
Amount of Subscriptions in arrear, ...	6,278 13 6	
Amount of outstandings for seeds, grafts, copies of the Journal, &c.	1,133 8 0	
		7,412 5 6

[illegible] eyor General's Office, Calcutta, for the Month of November, 1851.

		Observed at 9 H. 50 M					Observations made at Apparent Noon					Observed at 4 P M					Observations made at Sunset.					Rain Gauges.	
	Moon's Phases.	Barometer reduced to 32° Fahrenheit.	Temperature.			Wind.	Barometer reduced to 32 Fahrenheit.	Temperature			Wind	Barometer reduced to 32 Fahrenheit	Temperature.			Wind	Barometer reduced to 32° Fahrenheit.	Temperature.			Wind.	Elevation.	
			Of the Mercury.	Of the Air.	Of Wet Bulb.	Direction at 9 h 50 m.		Of the Mercury	Of the Air.	Of Wet Bulb	Direction at Noon.		Of the Mercury	Of the Air	Of Wet Bulb	Direction at 4 p m		Of the Mercury.	Of the Air.	Of Wet Bulb.	Direction at sunset.	Feet. 60. Upper	Feet. 5. Lower.
		Inches.	°	°	°		Inches.	°	°	°		Inches.	°	°	°		Inches.	°	°	°		Inches	Inches
	☽	30.067	79.5	81.4	74.2	N.	30.008	83.2	84.7	74.4	N N. E	29.944	85.4	85.0	74.5	N. W	29.690	83.6	82.2	74.6	N. W.	...	...
S		.067	80.2	81.6	73.0	E.	.004	83.6	84.6	74.0	Ditto.	.932	83.6	83.3	73.6	Ditto	.934	81.5	81.0	74.9	Ditto.	...	...
		29.979	79.0	80.5	75.0	N.	29.927	81.3	82.0	74.3	N. W	849	85.4	83.0	73.[illegible]	Ditto.	855	82.3	81.3	74.8	Ditto	...	...
		.908	79.4	80.8	71.5	Ditto.	854	83.2	83.8	72.0	N	.806	85.0	84.3	72.[illegible]	N.	.820	82.6	81.8	73.4	Ditto	..	...
		.961	79.0	80.8	71.5	Ditto.	.904	83.0	84.0	71.7	N. W	.856	84.6	83.8	71.2	N N W.	.864	82.4	81.3	72.2	N. N.W.	...	...
		.940	76.4	78.2	70.9	N. N. E.	.879	81.4	83.2	72.2	N	.833	83.6	83.0	72.1	N W.	.842	81.7	80.4	72.5	Ditto.	...	...
		.952	77.6	79.2	70.2	N	.893	81.3	82.3	70.4	N. W.	.845	82.0	82.0	71.3	N. N.W.	857	80.6	80.0	72.3	N. W.	...	...
		.924	78.6	80.4	71.3	Ditto.	.885	80.6	82.0	72.8	N.	.841	80.5	80.0	71.2	N.	.848	77.8	77.8	70.5	N.	...	...
S.	⊙	.964	76.3	77.4	71.4	N. W,	.901	81.4	82.0	72.2	N. W	850	82.8	82.0	72.2	N. N.W,	.864	80.3	79.4	70.8	Ditto.	...	...
		30.019	77.8	79.2	70.8	N. E.	976	81.5	82.5	72.8	N.	.911	83.6	82.8	71.4	N.	.920	81.6	80.4	71.3	Ditto.	...	...
		.014	76.3	77.9	69.6	N. W.	.959	80.3	82.0	70.0	N. N.W.	.892	83.7	83.3	70.3	Ditto.	.898	81.6	80.4	71.0	Ditto.	.	...
		29.967	78.3	80.4	69.9	N.	.915	81.4	83.4	70.6	N.	.848	84.0	84.0	70.6	Ditto.	.857	81.5	80.3	70.7	Ditto.	...	...
		.997	77.3	79.2	70.0	N W.	.945	81.0	82.8	71.6	N. W	.868	83.0	81.6	66.5	Ditto.	881	79.2	78.0	67.0	Ditto.	...	...
		30.010	78.3	75.2	65.0	Ditto	.953	77.6	79.2	65.3	Ditto.	.878	79.4	78.7	64.2	W.N W.	.878	77.3	75.5	67.1	W.	...	...
		.027	72.0	75.4	66.4	N.	.968	77.0	78.4	66.4	E.	.902	79.4	78.4	68.0	N. W.	.898	77.0	76.2	69.8	W.N W.	...	...
S.	☾	29.989	73.2	75.8	67.0	N W.	.937	77.5	79.9	68.8	N. E	.865	80.5	79.8	69.6	E.	.872	78.6	77.6	70.7	E	...	...
		.963	75.0	77.2	71.2	N.	.908	80.2	82.3	72.3	N	.844	83.0	82.2	72.0	N. N. E.	.847	81.5	80.5	72.6	N. N E	...	...
		.988	77.2	79.0	71.7	N E.	.939	81.2	82.2	73.2	N. E	.872	83.0	82.7	72.4	N	.882	81.2	80.0	72.0	N.	...	...
		30.060	75.4	78.0	66.5	Ditto.	30.003	81.0	83.0	69.8	N.	.923	82.2	81.2	68.3	Ditto	.920	80.0	78.4	69.5	Ditto.	...	...
		.031	72.0	73.9	66.8	W N.W.	29.968	77.2	79.2	69.2	W N W.	.871	80.6	80.0	66.9	N. W.	.872	78.6	77.0	69.5	N W.	...	...
		.007	72.8	74.5	65.4	N. W.	.951	77.4	79.2	67.0	N. W.	.870	80.0	79.3	68.4	W.	870	78.2	77.0	69.5	Ditto.	...	...
		29.947	74.4	76.5	69.3	Ditto.	.879	79.0	80.2	69.7	W	.813	80.7	80.0	70.2	N.W.	.826	78.0	78.0	70.6	Ditto.	...	...
S.	●	.879	75.5	78.5	70.5	S.	.821	80.5	82.4	70.6	S.	.780	83.4	83.0	73.2	S. S. W.	788	82.0	81.4	73.3	S. E.	...	...
		.954	75.4	76.6	74.5	N. W.	.906	80.3	82.4	75.6	N. N.W	.840	83.3	82.2	70.4	N.N W.	.840	81.6	80.0	71.8	N. N.W.	...	...
		30.021	73.6	75.4	67.0	N.	.957	77.5	79.0	68.0	N. W.	868	79.5	78.5	67.0	Ditto.	.902	77.0	76.0	67.2	Ditto.	...	...
		.053	71.3	72.5	65.0	Ditto.	.990	76.4	77.6	68.2	N.	904	79.3	78.5	68.7	Ditto.	.906	77.3	76.9	68.5	Ditto.	...	..
		.038	71.2	73.2	65.0	Ditto.	.980	76.8	78.5	69.5	Ditto.	.886	80.2	79.6	69.6	N.	.885	78.4	77.5	70.4	Ditto.	...	...
		.021	71.3	73.6	65.8	Ditto.	.969	77.4	79.8	70.2	Ditto.	.894	81.2	80.6	69.4	Ditto.	.903	79.2	78.4	70.3	N	...	...
		.039	71.8	74.3	66.2	Ditto.	.987	78.0	80.3	70.2	Ditto.	920	81.0	80.6	69.8	Ditto.	.929	79.2	78.5	70.0	Ditto	...	...
	☽	.066	71.1	71.9	65.5	Ditto.	30.007	73.6	75.9	67.9	N. N.W	.930	80.0	79.8	69.0	N. N.W.	.939	78.3	77.6	70.2	N N W.	...	...
		29.995	75.4	77.3	69.3		29.939	79.7	81.0	70.7		29.872	82.6	81.4	70.3		29.879	80.0	79.0	71.0		00 0	0.00
		30.015	76.5	76.7	69.3		29.967	80.6	80.1	69.5		29.912	81.1	79.9	69.1		[illegible]	[illegible]	[illegible]	[illegible]			

hese Observations have been made for the most part with a supply of new and first-rate Instruments, received
he Observatory, by orders of the Bengal Government, a brief description of the Instruments seems necessary.

Barometer by Troughton, used prior to the 1st June, 1844 Observations reduced to 32° Fah. = 29.498
" by Col. Everest, used from 1st June to 31st August, 1844, .. Ditto .. = [illegible]
No. 58. Stand[illegible]

Moon's Phases.	Observed at 9 H 50 M.					Observations made at Apparent Noon.					Observed at 4 P. M					Observations made at Sunset.					Rain Gauges	
	Barometer reduced to 32 Fahrenheit.	Temperature.			Wind	Barometer reduced to 32° Fahrenheit.	Temperature			Wind	Barometer reduced to 32 Fahrenheit	Temperature.			Wind.	Barometer reduced to 32 Fahrenheit	Temperature			Wind.	Elevation.	
		Of the Mercury.	Of the Air.	Of Wet Bulb	Direction at 9 h 50 m.		Of the Mercury.	Of the Air.	Of Wet Bulb	Direction at Noon.		Of the Mercury.	Of the Air.	Of Wet Bulb	Direction at 4 p m.		Of the Mercury	Of the Air.	Of Wet Bulb	Direction at Sunset.	Feet 60. Upper.	Feet 5. Lower
	Inches.	o	o	o		Inches.	o	o	o		Inches.	o	o	o		Inches.	o	o	o		Inches	Inches
	30 043	72 0	74.3	67 5	N. ...	29.986	77 0	76 6	67 2	N. N.W	29.905	79 2	78 4	66 6	N. W.. .	29.912	76.9	75.5	68 0	N. N. W.	..	. .
	.033	70.0	72.2	65.3	N. N.W	.972	75.6	77.6	66 0	Ditto. ...	.891	78.3	77.9	65 5	N. N.W.	.892	76.3	75.5	67.0	Ditto	...	. .
	.058	71 2	73.3	65 4	N. ..	.999	76.0	77 6	66.2	N .	943	78.3	77.3	64.3	N W. ..	.953	76.0	74 5	65 8	W. N. W	...	. .
	.083	68 5	70.4	62.4	N. W....	30.029	73.2	75.2	62.9	N. N.W	.971	76 0	75.2	62.4	N N.W.	.978	73.4	72 0	64 2	Ditto. .	...	. .
	.085	65.5	67.6	58.0	N. ...	021	72 0	73.4	58.3	N. W. ..	.941	74 4	73 7	58.8	Ditto. ..	.952	72.2	70.8	60.0	N. N W	...	. .
	.113	63.2	65.9	56.0	N. W. .	.055	70.2	72 2	59.2	Ditto. ..	.980	73 8	73 0	59 0	Ditto. ...	.993	71.4	69 8	60.4	N. W. ..	...	. .
	.114	63.5	66 4	59.2	Ditto. ...	.050	69.5	71 4	60.0	Ditto. ..	.962	73 4	73 0	59 6	N.W. ..	.974	71.0	70.0	61 3	Ditto ..	...	. .
⊙	059	63.0	65.3	57.7	Ditto. ..	29.987	70 0	72 8	62 5	Ditto. ..	.926	74.3	73 6	64.0	Ditto. ..	.934	72 0	69 4	62 6	Ditto. ..	...	.
	.056	63.4	66.0	57.4	W. ..	997	70.2	72.5	60.6	Ditto. .	.917	73.7	73 2	60.6	Ditto. .	.933	72.3	70 0	61.4	Ditto. ..	...	. .
	.124	63.5	66.2	58.0	N. W....	30 066	71.0	73.0	59.9	N. N W	30 009	74.4	74 0	59 2	N. N W	30 021	72 0	70 0	60 4	N. N.W	...	. .
	.147	64 6	67.4	58 4	N. .	.092	71 0	73 4	61.3	Ditto. ...	29 997	75 8	74.3	59.4	Ditto. ...	017	72.3	71 2	59.6	Ditto. .	...	. .
	.138	63.4	66.0	57.8	N. N.W.	.054	70 2	73 0	61.8	Ditto. .	30.017	74 4	73.7	62.4	N.W. ..	.028	70.8	70 0	63.2	Ditto ..	...	. .
	.126	65.6	69.0	62 8	N. W. ..	.077	72.7	75 0	65 4	W.N.W.	29.936	76.3	75 6	65.7	E. .	011	73.2	71.4	65 5	Calm. ...	...	. .
	.129	68.8	72.2	64.6	N. .	.059	74.6	77.0	66.3	N ..	30 007	76.7	76 2	65.0	N N W.	.007	74.3	72.8	67 2	Ditto. .	...	. .
☾	.107	69.0	71.4	64.2	Ditto. .	.048	73.7	75.6	65 8	Ditto ...	29.971	76 6	76.0	64 9	Ditto ..	29.977	74.4	73.4	66 4	Ditto ...	...	. .
	.088	68 0	70 4	64.3	N.N.W.	.026	74.0	76.2	66 2	N W ..	953	77.4	77.0	66 2	Ditto. ...	.961	75.0	74.0	67 2	N W. ..	...	. .
	.064	70.0	73.0	64.6	N. W. .	.027	75 2	77.3	67 4	Ditto ...	.947	77 8	77.4	67.3	S. W. .	.960	75 4	74 4	68 2	Calm. ...	...	. .
	.088	69.3	72.3	68.3	W. S.W	.023	75 0	76 9	69.0	W. ..	936	77 2	77 2	67.3	W. S.W.	.948	75.4	74 4	69.2	N. ..	...	. .
	.048	70.4	73.4	68.8	S. W. ...	.013	75 0	77 0	69 4	Ditto. ..	.926	77.3	76.8	66 6	N. N.W.	944	75 2	74 0	66 5	Ditto. ..	...	. .
	.097	69.0	71 8	65 2	N. E. ...	.043	75 0	77.0	67.3	N N. E	962	77.6	77.0	66 6	Ditto.	.972	75 5	74 3	66.4	N W ..	...	. .
	.102	70 2	72 8	65.1	N. N W.	.049	75.2	77 4	67.0	N.N. W.	.967	77 4	76 6	66.4	W.N.W.	.976	75 6	74 8	67.4	W ..	...	. .
●	.078	70.2	72 3	67 8	N. W ...	.022	75 4	77.5	67 2	S. W. ...	.946	77 2	76.8	67.4	S. W. .	961	75.2	74.2	68.2	S. W. .	...	. .
	.088	67.8	69.9	67.3	N. ..	.040	74.2	76 6	65.4	N.W. ...	.966	77 0	76.4	65.0	S. S. W.	975	75 0	73 8	66 8	W. ..	...	. .
	.074	68.0	70.2	63.2	W ...	.016	73 4	74 6	62.0	W. .	.931	75.6	75 2	62.2	N. W. .	.942	73 4	72 0	64 2	N. N W.	...	. .
	.092	67.0	69.3	61.6	N. W. ..	.036	74.6	76.6	62 5	N. N W.	.971	76.2	75 6	62 4	Ditto. ...	.997	73.7	72 7	63 0	N. W. ...	...	. .
	.118	67.3	70.2	93 4	Ditto ...	.054	73 2	75.2	63 7	N W.	.991	75.0	74 5	62.3	Ditto. ...	.991	72.8	71 6	63.5	W. ...	...	. .
	.065	66.0	68.8	59.5	N. E. ..	.009	72 0	74.2	[illegible]	W.N W	.947	75 0	74.4	60 8	W. .	.954	72.6	71 0	62.6	Ditto.	..	. .
	.068	66 4	69.4	62.0	Ditto. ...	.009	72.0	74 0	62.4	N. N W.	.940	75.6	75.0	61 3	W. N W	.942	72.7	71.2	62.7	W. N.W.	...	. .
	.117	64.4	68 2	58.4	E S. E	.056	73 0	75.4	63.5	W .	.992	75.5	75.0	62 3	N.W. .	30 004	72.7	71.4	63.7	N. W. ..	...	. .
☽	115	66.0	69.4	62.0	W. .	.046	72 4	75 0	63.4	N. W .	.961	76.0	75 4	62 2	N. N.W	29 967	73.6	72 0	63 2	Ditto. .	...	. .
	.072	67.3	70.0	61 0	E N. E	.014	72.4	75.0	64.0	N. N W	926	76.5	75.9	64.1	Ditto. .	.940	73.4	72.3	65.2	N. N.W.	...	. .
	30.091	67.2	69.8	62.5		30.032	73.2	75.3	64.1		29 958	76.1	75.5	63.5		29.968	73.7	72.4	64.6		0	0
	30.122	69.4	70.7	63.5		30.068	76 3	75.8	65.0		29.998	77.5	76.2	64.3		30.010	74.3	73.1	64.4		0	0

These Observations have been made for the most part with a supply of new and first rate Instruments, re[illegible]nto the Observatory, by orders of the Bengal Government, a brief description of the Instruments seems necessary.

Barometer by Troughton, used prior to the 1st June 1844 Observations reduced to 32° Fah = 29.493
by Col. Everest, used from 1st June to 31st August 1844, ... Ditto .. = 29.637
[illegible] Ditto ... = 29.654